

THE IRON AGE

THURSDAY, AUGUST 20, 1891.

Central American Trade.

Notwithstanding the advantages arising from the wider diffusion of information through the Bureau of American Republics, established in the State Department at Washington, our consuls frequently speak of the indifference manifested by merchants in the United States to the extension of trade with the Southern republics.

For instance, Consul-General Kimberly, who is Secretary of the Legations of the United States to Costa Rica, Guatemala, Honduras, Nicaragua and Salvador, says that of the \$9,000,000 or \$10,000,000 of annual importations to Guatemala alone, scarcely 10 per cent. comes from the United States.

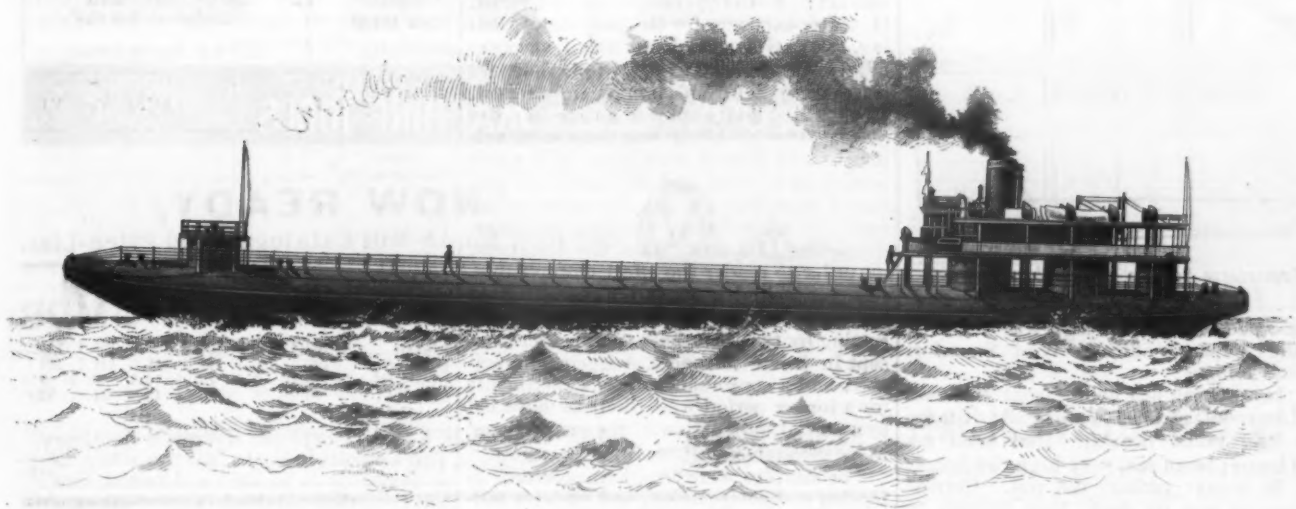
While searching for the causes of the supposed condition of affairs the Consul-General wrote a series of letters to business men having large interests in Guatemala, "for the most part," he says, "American," asking them why the United

Valley and Shenango, Pa., \$2.20; Cleveland, Ohio, \$2; Hocking Valley, Moxahala, Shawnee and Zanesville, Ohio, \$2.20; Columbus, Ohio, \$2; Jackson, Wellston, Ironton, Ashland, and Hanging Rock, Ohio, \$2.20; Detroit, Mich., \$1.70.

The Whaleback Boat.

Last week a boat of decidedly unusual and strange appearance steamed into New York harbor. She came in ballast from Liverpool, being 14 days on the journey. The boat was long, narrow and presented the appearance of an immense barrel, provided at the bow with a small superstructure and at the stern with more elaborate decks, through which passed a smoke stack. Between these two there was nothing visible except a curved deck provided with side railings. This boat, the Charles W. Wetmore, is the latest addition to a fleet of barges which have done much to

forward of the structures at the stern protects the smoke stack, the second one is occupied by the compound engines driving the screw, the third being the companion-way. Above are the dining room and cabins. The vessel on her voyage from Liverpool experienced considerable rough weather, and although she had an unusually light load and rolled considerably she behaved well, and very fully met the expectations of her builders. Motive power is furnished by a compound engine of 850 indicated horse-power, 26 x 50 inches diameter of cylinders and 42½ inches stroke, built by Samuel F. Hodge & Co. of Detroit, Mich. The boilers, of the regular marine type, were built at the Lake Erie Boiler Works, Buffalo, N. Y., and are 11 feet 6 inches in diameter and the same in length, and are intended to carry 125 pounds of steam. The boat when burning ¼ ton of coal per hour has a speed of 14 knots. The Wetmore was built by the American Steel Barge Company, at



THE WHALEBACK BOAT C. W. WETMORE.

States had not secured a larger share of the commerce of that country. A member of one American firm mentions among the reasons, unwillingness to give long credits, while the laws of the country are such that fraudulent failures are unknown; sending price-lists and catalogues subject to discount, instead of making all prices net, and failure to pack goods so as to endure the necessary and frequent transfers from steamers to lighters, from lighters to cars, from cars to lighters and from lighters to steamers again, &c. "The freights from New York to San Jose de Guatemala," says this merchant, "are double what they are from Hamburg, Germany, and it will pay any merchant in Central America to ship bulky goods from New York to Hamburg, and have them re-shipped at the latter place for Central America."

Chairman Blanchard of the Central Traffic Association gave notice on the 12th inst. that the resolution of the Freight Committee adopted March 11, 1891, provided that the special iron tariffs, which became effective March 30, would not extend beyond August 31, 1891; therefore, the rates in question would be restored to the official classification, beginning September 1. The rates to Chicago will be as follows: Buffalo, N. Y., \$2.50; Pittsburgh, Pa., \$2.50; Mahoning

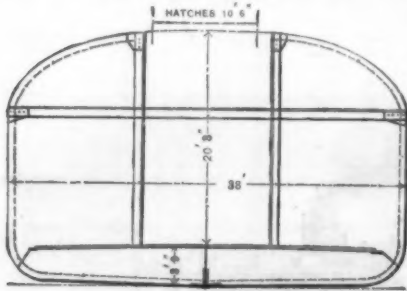
revolutionize freight traffic on the great lakes, and which their projectors confidently expect will do equally good work on the ocean. The boat is 265 feet long, 38 feet breadth of beam, 24 feet depth of hull and draws 15 feet 6 inches with a dead weight of 3000 tons. Her hull is formed of steel plates, stiffened by angle-iron ribs and struts, as shown in the cross-sectional view. Just abaft of the forward house is a transverse bulkhead, a similar one being placed forward of the engine and boiler compartments in the stern. The space intervening is unincumbered, and forms the hold or freight-carrying compartment of the boat. At intervals in the top of what we may call this central compartment are hatches, through which the load is introduced. When once loaded these are battened down and the cargo perfectly protected from the entrance of any water, even should the waves wash completely over the deck. This forms practically a sealed hull for the reception of freight of any description. By consulting the cross section it will be noted that extending across the bottom of the boat is a compartment for water ballast measuring 3 feet 9 inches in height in the center, and which really serves as a double hull. The forward house protects the wheel and the companion-way leading to the compartment in the bow. The most

West Superior, Wis., and having offices at 36 Wall street, New York. She was designed by Captain Alexander McDougall of Duluth, Minn.

This boat is the outcome of practical experiments made on a smaller scale, with barges intended to carry freight on the Great Lakes, but not provided with their own propelling power. The admirable results obtained by these experiments, the unusual loads the boats would carry and the ease with which they could be towed, justified the designers in their more ambitious endeavor, as exemplified in the Wetmore. The fleet now consists of 11 boats, the tow barge 101, a small craft of 437 tons registry and 1400 tons carrying capacity being the first. This boat was built in 1888, and immediately received the nickname of "Pig," a name which has followed all of her successors. The first steam propeller, the Colgate Hoyt, named after the president of the American Steel Barge Company, was built in the following year, and since that time has been in successful commission, carrying ore, grain and coal between Lake Superior and Lake Erie ports. The depth and width of the bottom of the Wetmore, and, in fact, all boats which are to follow, were governed by the dimensions of the Welland Canal, through which she was intended to pass in order to reach the ocean from the great lakes. All the "whalebacks," as

they are generally known, are built upon the same general pattern—that is, a round deck, vertical sides, flat bottom and ended up like the pointed end of a cigar.

On the outward voyage to Liverpool the *Wetmore* loaded with 70,000 bushels of wheat at West Superior elevators, and cleared coastwise for Duluth, where her equipments were inspected by Government inspectors. At Duluth she took foreign clearance papers, which carried her to Kingston, Canada, where she lightened her cargo in order to make the run of the St. Lawrence rapids. At Kingston she took Canadian clearance papers for Montreal. At Montreal the shipping inspectors required that a bulkhead should be put in the vessel from end to end to prevent the shifting of the cargo, a requirement which nettled Captain McDougall until he raged like a mad walrus. The vessel then reshipped her cargo and 25,000 bushels additional. In order to show his contempt of the bulkhead requirement, Captain McDougall directed the master of the vessel, Captain Saunders, to pile a lot of coal on the upper and round deck, where it would be fully exposed to high seas or the tumbling of the boat. On August 1 Captain Saunders'



Transverse Section of Whaleback Boat.

memorandum of the voyage was received at the company's office in West Superior. It is as follows:

"In steaming 384 hours from Montreal to Liverpool used 226 tons of coal; distance run 3032 miles (knots). Had head sea 100 hours; beam sea, very high, 50 hours; aft, 50 hours; various the rest. Carried 26 tons of coal on deck from Sydney to clear off banks; rough sea; lost no coal; this is evidence of ship's ability."

A novel question is involved in the voluntary assignment of the National Forge and Iron Company, who have their works in Indiana. Saturday morning at 10.30 the Chicago Machine and Power Company began an attachment suit against the first named company in the Lake County Circuit Court, Indiana. At noon the company made a voluntary assignment in Cook County, Ill. In the afternoon other creditors began attachment proceedings in the Indiana court. The sheriff had taken possession under the first attachment, and the other creditors assert their right under Indiana law to intervene in the first suit and maintain prior liens to those created by the Illinois assignment. The assignee having no control of the property, his attorney made a motion to have the attachment suits dismissed so as to place the assignee in charge of the assets. The attachment creditors object vigorously and argue that the Chicago court has no jurisdiction. Judge Brown took the matter under advisement.

Consul Turner of Cadiz is of the opinion that there is an open road to trade with Spain if our exporters would only carefully endeavor to follow it. He points out that exporters would find it profitable to send men prepared to introduce agricultural implements, petroleum, hardware, cutlery, machinery, &c.

Effect of Pickling and Rusting on the Strength of Iron.*

BY A. LEDEBUR.

These experiments have been undertaken in order to obtain further information concerning the brittleness imparted to iron by the action of acid in pickling and by atmospheric rusting, which had been previously announced by the author and other investigators, and to determine whether dangerous deterioration was likely to ensue from such causes. The former experiments having mostly been made with wires it was considered most desirable to extend them to objects of larger section, such as rails, beams and bars. That has accordingly been done with the following articles:

(1) Steel rails, the Prussian State line section from Krupp's; (2) wrought-iron beams, $9\frac{1}{2} \times 3\frac{1}{2}$ inches, from Koenigshuette; (3) wrought-iron round bars, 0.8 inch diameter, from Lauchhammer; (4) steel round bars, 0.8 inch diameter, from Peine; (5a) wrought-iron wire, 2.2 mm. diameter, from Felten & Guillaume; (5b) steel wire, 2.2 mm. diameter, from Felten & Guillaume.

These were treated in the following manner: I. In the condition as delivered. II. After exposure for the purpose of rusting. III. Galvanized and tested at once. IV. Galvanized and exposed for a time. V. Pickled in acid and immediately tested. VI. Pickled and kept for a time in a dry place. The pickling was done with sulphuric acid diluted with water in the proportion of 1 : 100, and the metal was protected from direct attack by covering one end with melted zinc, the time of immersion being 17 hours. In a few instances, in order to render the effect more visible, stronger acid 1 : 50 and a period of 41 hours was used. The alteration due to rusting by two months' exposure was, except in a few instances, scarcely appreciable, and a continuance of the experiments for a longer period was likely to have led to a partial destruction of the material and to erroneous conclusions from the result.

The samples were tested transversely in tension and compression, and under a falling weight, three experiments being made on the same sample for each of the six conditions, and the tabulated results given at length fill 24 pages. The general conclusions given in the introductory report are as follows:

1. *Bending Tests with Wrought-Iron Beams.*—The elastic properties, amount of bending and limit of proportionality are substantially the same for all the conditions tested, the flexure for given loads being almost identical when the average results are compared. The maximum loads carried show differences, being highest in the natural conditions and lowest when freshly pickled. Rusting also produces a diminution in strength, which is more apparent in the galvanized than the ungalvanized pieces. In the few instances where the specimens were broken by the tests, the diminution in strength is very decided in the pickled and perceptible in the rusted specimens. The figures for these are:

Conditions	I.	II.	IV.	V.	VI.
Breaking strain.	35	33.9	32.7	29.6	30

Bending Tests with Steel Rails.—The length between the supports was 1 m. None of the specimens were broken. The average values from the results show that neither elastic nor ultimate strength is affected by any of the methods of treatment, the rusted specimens, whether galvanized or not, giving rather the highest

figures. This may possibly be due to the chemical composition, which is as follows:

	Per cent.
Carbon.....	0.25
Silicon.....	0.21
Manganese.....	0.47
Phosphorus.....	0.1
Sulphur.....	0.06
Copper.....	0.08

A very marked difference was observed in the behavior of the pickled specimens. Those of wrought iron, even after immersion for several hours in lime water to remove all traces of free acid, gave off a strong smelling gas, probably a hydrocarbon compound, for several hours, while those of steel were perfectly odorless. This seems to show that acid sets up chemical changes in wrought iron that it is not competent to produce in steel.

Tensile Tests with Round Steel and Iron Bars.—Neither ultimate nor elastic limit was sensibly altered by any method of treatment under the conditions of the experiments, but it is considered that differences might have been produced had the action been longer continued.

Tensile and Bending Tests on Wires.—The strength of ungalvanized wire, both of iron and steel, is diminished by rusting. Galvanizing diminishes the absolute tenacity, but increases the proportion of elongation. The elastic limit and ultimate tensile strength observed for the different conditions were:

	I.	II.	III.	IV.	V.	VI.
<i>Iron.</i>						
Elastic (kilograms per millimeter)	51.9	42.5	45.1	50.2	...	...
Ultimate (kilograms per millimeter)	55	50.6	52.4	52.6	55.8	57.1
Elongation (per cent.)	4	3.3	15.1	13.5	5.5	5
Bends.....	12	10	11	9	7	11
<i>Steel.</i>						
Elastic.....	109.1	107.7	103.9	103.9	109.1	114.3
Ultimate.....	121.1	117.7	116.3	117.3	121.7	121
Elongation.....	8.7	7.5	18	16.5	9	9
Bends.....	13	9	12	12	11	12

These results indicate that the diminution of flexibility in pickled and rusted wire is less than that obtained in previous experiments. This, however, is mainly due to the circumstances that in the latter the acid used was stronger, or the action, if weak, was allowed to continue for a much longer time.

Compression Tests with Iron and Steel.—These were applied to test pieces 30 mm. and 50 mm. high. No very sensible differences due to treatment were observed, the diminution of height for successive equal increments of weight being about the same. The ultimate strength was not determined, owing to the bending of the test pieces and the limit of power in the machine, which was 100 tons. Under the impact of a weight—viz., 56.7 kg falling 1 m.—freshly pickled wrought iron was bent about 10 per cent. more by the same number of blows than when in the state received from the works. This effect was obtained with the steel specimens. A supplementary series of bending and falling weight tests was made upon bars about 48 mm. square of steel of the following composition:

Carbon.....	0.51
Silicon.....	0.75
Manganese.....	1.42
Phosphorus.....	0.09
Sulphur.....	0.094

both in the natural condition and after pickling with acid 1 : 50 for 41 hours. There was no difference in the elastic limits under steady loading, but by impact the pickled specimens bent more readily after the fourth blow than the unprepared ones. The breaking strain under either condition was sensibly diminished from

* From the Transactions of the Royal Technical Experiment Bureau, Berlin, 1890, through Proc. Inst. Civ. Eng.

142.7 kg. to 126.8 kg. under steady load, and from 1643.5 net kg. to 895.6 net kg. total energy of blow to produce fracture by the falling weight. The diminution is not, however, as large as that observed in previous experiments, where the breaking strain was reduced from 169.5 kg. to 102.5 kg. by pickling. The latter results were, however, obtained with bars of smaller section—22 mm. as against 48, and which had remained in the acid for nine days. The steel treated on the present occasion was also exceptionally tough in silicon, which no doubt added to its resisting power. As regards chemical composition the susceptibility of iron to become brittle by pickling and rusting is least in cast iron and silicon steel, and highest in wrought iron, and, according to Budecker, in high-carbon steel. Combined carbon appears to increase the action and silicon to diminish it. The influence of manganese in either direction has not as yet been determined.

Power of 110-Ton Gun.

The accompanying engraving, which we take from our contemporary, *Engineering*, is intended to show the tremendous power developed by a 110-ton 16-inch breech-loading gun. It will be observed that the projectile has passed through 20

In the ordinary open-hearth furnace the composition of the charge varies largely with the supply of scrap, but may be taken to be, on an average, 30 pig iron to 70 scrap. We may assume for a calculation the price of pig iron at \$19 a ton, and that of scrap iron at \$21 a ton. The cost of the ore briquettes may be estimated as follows:

Ore, crushed, ground and concentrated to 64 per cent. of iron can easily be obtained in ordinary practice at 5 cents a unit, and in many places at a cheaper rate,* so that a ton of such ore will cost \$3.20. Coke can be obtained at the rate of \$4 a ton, and anthracite coal, which would be very good to use in these briquettes, is as cheap or cheaper. But as the coke or coal has to be ground to a fine powder, we will suppose it to cost even \$5 a ton. Briquettes of a good composition will contain about 21 parts coke to 100 ore; in other words, a ton of ore will require 0.21 ton of coke. Briquettes containing a ton of ore will then cost:

1 ton of ore.....	\$3.20
0.21 ton of coke at \$5.....	1.05
Total.....	\$4.25

But a ton of metallic iron requires the use of 1.56 tons of 64 per cent. ore, and will cost $1.56 \times \$4.25 = \6.63 . The labor in both cases will be the same, except for the making and drying of the

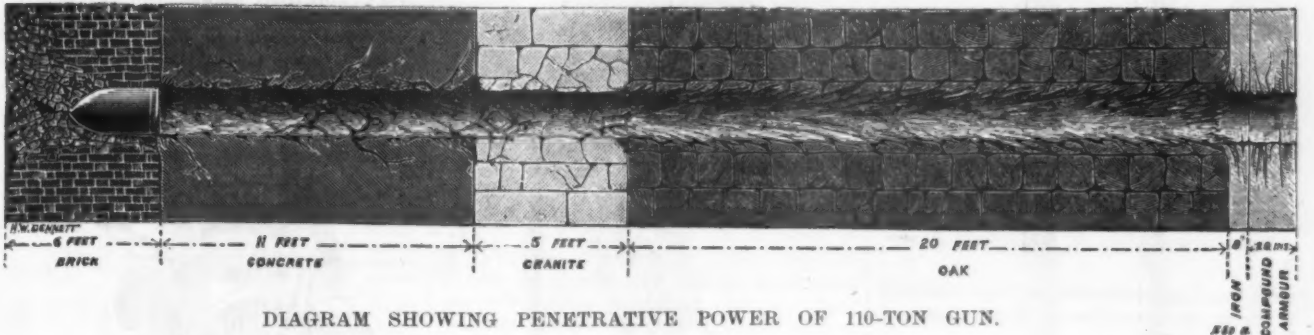
of relining can be considered to be the same in both cases.

The same might be said of the number of heats in 24 hours. This number, as is well known, depends largely on the repairs required by the furnace. As these repairs will not be heavier in one case than in the other we may say that practically the same number of heats can be made in both cases in 24 hours.

If we admit, furthermore, that the loss of iron in the pig and scrap process is about 10 per cent., and that this loss in the Imperatori process will not be higher, as has actually been shown for this latter process, by several heats during the tests (and it is even lower than 10 per cent. according to the tests made in Europe), we can easily establish, as to the cost of steel in the two processes, a comparison which may be confined to those items which constitute the difference between them.

Ordinary Pig and Scrap Process.

One ton of iron	Pig iron, 0.30 @ \$19...	\$5.70
charged	Scrap, 0.70 @ 21...	14.70
Loss, 10 per cent.; hence, cost of 0.9-ton product.....		\$20.40
Cost of 1 ton product.....		22.67
Imperatori Process.		
0.40 ton pig iron, at \$19.....		\$6.60
0.20 scrap, at \$21.....		4.20
0.26 iron in 40 per cent. ore, at \$7.41.....		2.96
0.86 ton iron charged.....		\$14.76



inches of compound armor, 8 inches of iron, 20 feet of oak, 5 feet of granite, 11 feet of concrete and has entered about 3 feet into the brick work, making a total penetration of 41 feet 4 inches. It is useless to conjecture as to the real usefulness of a gun of this size in actual warfare.

The Imperatori Process.

In an elaborate paper on the experiments carried out at the Croton magnetic mine with the Imperatori process, J. P. Nau, who was acting as consulting engineer of the parties interested, makes the following comparison of cost with the ordinary open-hearth process. The paper was presented at the Cleveland meeting of the American Institute of Mining Engineers:

The cost of 1 ton of steel in the two processes depends on:

1. The prices of the raw materials used in the charge and their relative proportion.
2. Labor.
3. Furnace repairs.
4. The number of charges made in 24 hours.

As to the price and proportions of raw materials, it has been found at the steel works of Savona, Italy, where the Imperatori process was first used, and where the excellent results obtained since its introduction, both as to quality of steel and economy of operation, have led to its final adoption in current daily practice, that the amount of scrap used in the charge ought not to be higher than about 25 per cent., and even less if possible. The average composition of a charge in this process may be given as follows: 40 pig iron, 20 scrap, 40 ore in briquettes.

briquettes. In current practice these briquettes will be made by machinery, and it will require only a few men to make from 800 to 1000 briquettes a day, weighing each from 50 to 60 pounds, so that they can be made very cheap. As a liberal estimate, we will take 50 cents per ton of ore, so that the final expense per ton of iron in the ore would amount to:

Ore and coal (both ground).....	\$6.63
Labor on 1.56 tons of ore at 50 cents per ton.....	.78

Total cost of briquettes containing 1 ton metallic iron.....\$7.41

We have now to consider the repairs to the furnace and number of charges made per 24 hours. The average total duration of a test heat, as previously stated, was 8 hours 50 minutes, while the corresponding time in the ordinary pig and scrap process is about 8 hours; this would make a difference of about 1 hour in the time required.

Now, in the ordinary pig and scrap process the amount of gas coal consumed amounts to about 30 per cent. of the weight of steel obtained. Consequently, if the charge in the Imperatori process were to last about 1 hour longer, it will require about one-eighth of coal more, or say in all about 34 per cent. of the weight of steel.

As to repairs, it has been already stated, and with the ordinary so-called ore process it has been demonstrated at many works in Europe, that a neutral lining will require very little repairs and will last for several hundred heats; so that the expense

Hence, 1 ton of iron charged (or, after allowing for 10 per cent. loss, 0.9 ton of product) would cost.....\$17.16
Or, cost of 1 ton of product.....19.06
To which must be added 4 per cent. excess of gas coal over the 30 per cent. of the weight of the steel which is required in the ordinary process, or 0.04 ton, at \$5......12

Making a total, material and fuel, of \$19.18

The difference in favor of the Imperatori process is \$3.49 per net ton of steel obtained. This economy is important, but it does not constitute the only advantage of the process. In an average charge in the Imperatori process, composed, as has been said, of 40 pig, 20 scrap and 40 ore, the chemical composition of each constituent can be accurately ascertained. The pig iron will generally be low in silicon, sulphur and phosphorus; such iron can easily be obtained at reasonable price. The scrap used can be wholly supplied by the crop ends, rail ends, &c., from the works themselves, no outside scrap being needed; consequently its chemical composition will be the same as that of the finished product, and can always be relied upon.

As to the ores used in the briquettes, there will be no difficulty in securing at low rates concentrated ores (not much used at present) almost free from phosphorous and sulphur, and consequently constituting an excellent material for the production of the best quality of steel.

The carbonaceous material for the briquettes may be either coal or coke or charcoal or anthracite, as long as it does not contain too high a percentage of sulphur. Charcoal is very well adapted to this process, as it is very generally free from sulphur and phosphorus. Thus the

* See Transactions, "Progress in the Magnetic Concentration of Iron Ores," by John Birkinbine. New York meeting, September, 1890

well-known chemical composition of the raw materials used will allow of obtaining, at a low price, a very good quality of steel, which is not always obtainable in the ordinary pig and scrap process.

Another very advantageous feature of the Imperatori process is the facility with which many ores, hitherto almost useless, could be treated, thus enlarging their market, now very limited. Thus many lean ores largely found in the States of New York and New Jersey, and, in fact, in almost every one of the United States, would constitute, when once ground and concentrated, an excellent material for this process.

In Morris County, N. J., ores are mined containing only from 30 to 37 per cent. iron with 0.085 sulphur and 0.06 phosphorus, which, concentrated, furnish powdered ore containing 64 to 65 iron,

tion. The source is a mountainous stream 8 miles distant. The pipe used is wrought iron, spiral riveted, 12 inches in diameter at the dam, reduced by stages to 7 inches where it enters the distributing reservoirs.

Portable Drilling Machines.

The accompanying engravings show the No. 5 portable drill, countershaft and power transmitter made by Albert L. Colburn of New Haven, Conn. The drilling mechanism of this machine is very simple; the clamps can be easily and quickly adjusted to clamp on to a flange or part of the machine in which holes are to be drilled. The cross clamp near the upper end of the post allows the drill to be swung around or over to any angle. The feeding device is a patent differential

runs to and from the drilling machine are held by a frame with a hollow stud, through which the rope passes, allowing the idle pulleys to turn around radially and guide the rope to the drill in any direction, while the weighted idler by its rise and fall takes up the slack rope. By inserting sections of rope by hooked couplings any distance may be reached. One of the main features of the countershaft is the idle pulley placed up near the driving pulley and by which the rope, which usually encircles about half the driving pulley, is made to encircle nearly the whole of it. The upper post consists of a socket which is first bolted to the ceiling or any convenient timber by three lag screws. When the yoke containing the driving pulleys is inserted, the pulleys are lined up by the eye until the belt is put on, when the yoke is slightly turned until the belt runs in the center of the loose pulley, no leveling or other lining being necessary.

Fig. 3 shows the patent power transmitting device. It is shown in Fig. 1, attached to the drilling machine. It can be used for various purposes. When light power is required, such as portable cylinder boring and valve-seat facing, machines in use in locomotive repair shops, it consists of a steel shaft, in one end of which is a socket and to which the grooved driving pulley is secured. This driving pulley is in a double three-legged spider or frame, with bearings on the shaft. This spider carries another swivel frame containing two idle pulleys, which guide the rope on to the driving pulley in whatever position it may be. The two guide pulleys cause the rope to encircle nearly the whole of



Fig. 1.—Portable Drill.



Fig. 2.—Universal Countershaft.

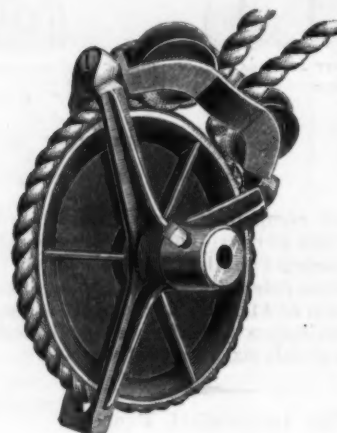


Fig. 3.—Power Transmitter.

THE COLBURN PORTABLE DRILLING MACHINE.

0.02 sulphur and 0.02 to 0.03 or even less phosphorous. These are well adapted to be used in the Imperatori process.

Besides these concentrates, most of the magnetic sands found in large deposits in Canada and in the United States, and containing a high percentage of iron (as high as 66 per cent. in certain cases), could be made available by this process. Many of these sands, if not rich, are physically associated with earthy substances which a simple washing could remove, furnishing a practically almost pure oxide of iron in powder, at a low price and particularly well adapted to be made up into briquettes. Another advantage of this process is its easy adaptation to any existing open-hearth plant, as it can be carried on in any existing furnace without the slightest alteration or addition.

American contractors have just completed water works for the city of Tegucigalpa, Honduras, giving much satisfac-

tion. The source is a mountainous stream 8 miles distant. The pipe used is wrought iron, spiral riveted, 12 inches in diameter at the dam, reduced by stages to 7 inches where it enters the distributing reservoirs. gear, has quick return and is entirely inclosed; it takes up less room than a worm and gear, and cannot be clogged by dirt or chips. The feeding motion is transmitted to the drill spindle through a rack and sleeve, the same as in the modern upright drilling machines. Power can be applied directly to the end of the spindle for small holes or at the end of the pinion shaft, as shown in Fig. 1, for larger work. The machine is adapted to drill holes up to 1½-inch diameter from the solid, and by the use of a boring bar or counterbore can be used for holes up to 2½ inches. The spindle has a feed of 6 inches and where the hole is parallel with the upright post it can be drilled 1 foot or more deep by moving the radial arm down on the post. The end of the spindle is reamed for No. 4 Morse taper; the post is 36 inches long and the radial arm 12 inches. The machine weighs 115 pounds.

Fig. 2 shows the universal countershaft. The two idle pulleys over which the rope

the driving pulley, and it is impossible for the rope to slip even under the severest strains.

A Chicago paper of the 13th inst., says: "Captain Miner of the big steel steamer E. C. Pope, was around town yesterday feeling very much elated over the great feat of his boat in bringing 3139 net tons of iron ore from Ashland to South Chicago. With this load, which beat all records of Lake Superior cargoes, the Pope drew but 14 feet 3 inches forward and 14 feet 4 inches aft. Such a load on that draft of water has probably never been carried in the United States before. The Pope, which is now on its first season, having been built in Detroit last winter, is entitled to the palm of being the biggest carrier on fresh water. A month ago she broke the record on cargoes carried through Detroit and St. Clair rivers by taking 3607 net tons of ore from Escanaba to Lake Erie."

The Hunt Bronze Bosh Plates.

Much has been said and written within the last two or three years concerning bosh-cooling plates for blast furnaces, and a number of meritorious devices have been put on the market. The accompanying illustration shows an improved design applicable to both bosh and crucible, although more particularly intended for boshes of furnaces, for effectually protecting and cooling the same. This improved plate is the invention of Morris R. Hunt, manager of the Hinkle Furnace, Ashland, Wis., who has had 25 years' experience in the management of charcoal furnaces and practical tests of all kinds of the various bosh-cooling devices heretofore intro-

duced. One of the most effectual outside cooling devices heretofore known is a steel jacket, which, being double riveted, forms a water-tight shell around the bosh and is cooled by a system of sprays, with a water trough at the bottom for collecting the water which flows over its surface. This device is ordinarily $\frac{1}{2}$ inch to $\frac{3}{4}$ inch thick and its cooling is dependent upon the amount of water from the sprays, which flow by gravity down its exterior. Hence it cannot be effectually cooled, as steam is formed by the water coming in contact with the hot plate, which prevents a close contact of cold water with it. To avoid the difficulties above mentioned, Hunt's bosh plates have been devised and letters patent, dated May 19, 1891, have been issued.

continuous throughout, horizontally and vertically, and as strong as a $\frac{1}{2}$ inch to $\frac{3}{4}$ inch steel jacket. By a luting of fire clay and asbestos, placed on the face of these projections, a positively gas and water tight jacket is secured. By constructing the bands which surround the plates of such circumference as to engage the lugs, as shown in Fig. 3, the keys, which are shown in half section, "Section 1," may be readily removed and one or more plates can be quickly removed and replaced, should occasion require, and that without affecting the remaining support afforded by any band. Thus no portion of the entire bosh is weakened except the point where the plates are taken out. That this arrangement admits of the renewal of the

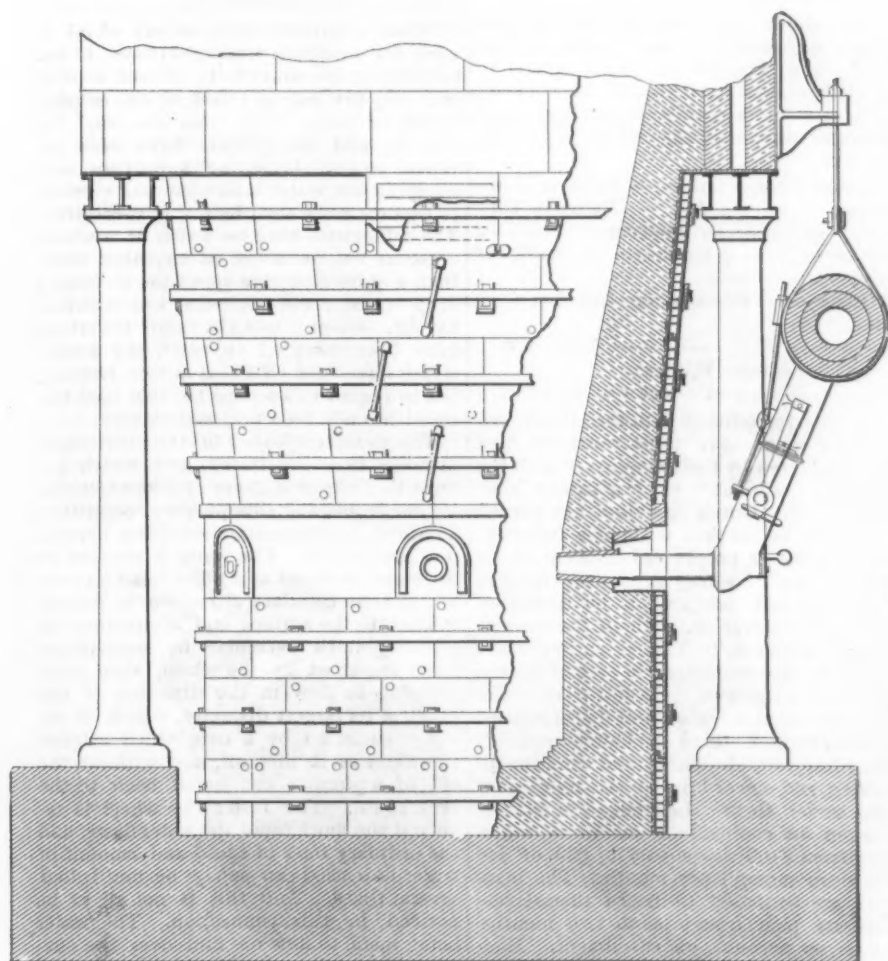
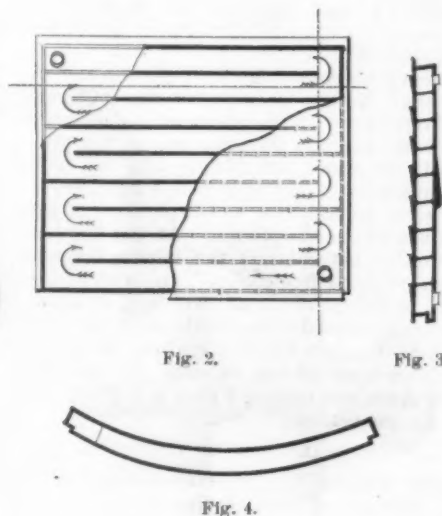
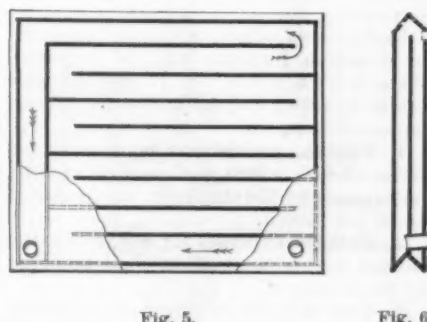


Fig. 1.—Side Elevation and Vertical Section.



Figs. 2, 3 and 4.—Construction of Single Plate.



Figs. 5 and 6.—Upper Course Plate.

THE HUNT BRONZE BOSH PLATE FOR BLAST FURNACES.

duced. One of the principal objections to building circular plates in the brick work of the bosh, at regular distances apart vertically, is, that the spaces between these plates, not being subjected to and protected by the cooling influences, are gradually cut away, owing to intense heat, forming ledges or projections into the furnace. These irregular surfaces or series of scaffolds prevent the regular and uniform descent of the stock, and thereby cause irregular working of the furnace with increased consumption of fuel. Bosh walls cut away sooner or later, and any device is objectionable which prevents their wearing away uniformly. Mr. Hunt's device admits of the building in of the minimum amount of brick work inside the plates, and the inner wall is gradually and uniformly worn away until further wearing or widening of this portion of the furnace is prevented by the cooling effects of these plates. In fact, the plates can be so arranged as to preserve any given angle or lines desired.

Referring to the drawings, Fig. 1 is a side elevation, partly in vertical section, showing the bosh and crucible of a furnace supplied with the Hunt bosh plates. Fig. 2 shows construction of a single plate, Figs. 3 and 4 sections of same. Fig. 2 shows the ordinary construction of plate, in which the water enters at lower right-hand corner and passing through the tortuous passages, as indicated, leaves the plate at outlet in upper left hand corner. Figs. 5 and 6 are modified forms of these plates to suit various contingencies which may arise. Fig. 5 shows the inlet and outlet at bottom of plate. This form is intended for the upper course of plates, to avoid making connections behind mantle bar.

The entire jacket can be placed on the outside of the brick work of the furnace when completed, or the plates can be erected and firmly banded and keyed and the masonry built inside of same, which latter form is preferred. The object of the interlocking projections, shown in Fig. 2, is to make the jacket practically

destroyed plate and the replacing of it by a new one, in a very short time, is apparent; and we know of no other outside cooling device which will admit of this.

Water connections for these plates can be connected singly or in series of any number, as desired. The two bottom rows that are subjected to the greatest heat can be supplied with separate feeds and discharges if necessary. Fig. 3 shows lugs as constructed on the inside of plates for the purpose of intercepting and holding the kish, or graphitic coating mixed with slag, which is deposited on the walls, and the furnace can be run on this lining. This device is also particularly adapted to the many copper and lead smelting furnaces which require perfect water cooling plates. Estimates and specifications can be obtained from Best, Fox & Co., Pittsburgh, Pa.

The assessed value of real estate in Philadelphia is \$732,300,000, an increase of \$21,659,000 over the previous year.

Labor in Tin Mines in the East Indies.

In an elaborate paper, contributed by Charles M. Rolker to the American Institute of Mining Engineers, on "The Alluvial Tin Deposits of Siak, Sumatra," he gives the following interesting data on the coolie labor of the East:

The ordinary workmen employed for mining and allied occupations are Chinese, who are either imported direct by the employers or are obtained more generally through Chinese agencies, which exist in different parts of the East. These agencies import the men direct from China, at their own expense, under contract, and then sublet them to individuals or corporations at a fixed cash price per head (supposed to cover expenses and profit of the importing agencies) and under agreed and stipulated conditions with their employers, which are signed by both parties and attested in the presence of the "Chinese Protector."* The wages of the ordinary coolie are \$30 Mexican money per year. \$18 of which are advanced to him upon enrollment. The agency in Singapore receives, in addition, a cash payment of \$20 for a 12-months' coolie. At the termination of his contract the laborer becomes an "old or free coolie," and is at liberty to re-engage of his own volition, at a previously agreed price, to the same party, or make his own terms elsewhere, or return to the town whence he came. As a novelty to American miners, I give a copy of one of these contract forms.

GENERAL FORM OF CONTRACT.

For Chinese Engaging to Labor in this Colony and in the Native States:

It is this day mutually agreed between the employer the A. B. C. Company, his attorney, heirs, or assigns, and Tu-Tru, Chinese laborer, born at ———, and aged — years:

That the said laborer is willing to proceed to Kotarana Sumatra and be employed there as a tin miner, for 12 months, at a yearly wages of \$30 subject to the following conditions, viz.:

1. That the said laborer receives an advance of \$18, which shall be deducted by instalments by the employer, at the rate of \$1.50 per month.

2. That the expenses for conveying the laborer to his destination shall be borne by the employer.

3. That the said employer shall furnish the laborer with a suitable house, for which the latter will not be required to pay rent.

4. That the said employer shall provide the laborer with his daily food; and also furnish him with one jacket, two pairs short trousers, one mosquito-curtain, two bathing cloths, one sun hat and a pair of clogs.

5. In the event of the laborer falling ill from natural causes, the employer shall furnish him with medicine and a place for his medical treatment until recovery, and if the days of illness do not exceed 30 days, the loss of time shall be borne by the employer, and the laborer will not be required to make up for it. But should the illness of the laborer exceed 30 days during one year, or should he fall sick from his own fault, or contract any venereal disease, he shall, on recovery, or after the termination of his agreement, make good the days of his illness, and shall also pay to the said employer 27 cents as costs of food for each day's absence. Should the laborer desert and be captured, all expenses actually incurred shall be repaid by him.

6. Should the laborer be unable to work on account of venereal disease, or stop work through laziness, the number of

days of such absence, together with any advances he may have received, shall be endorsed on the contract, and should there be, at the expiration of the agreement, any sums outstanding, the laborer shall work at the rate of \$6 per mensem, as in the case of old coolies, until the whole amount has been paid. Whenever there is any dispute, the agreement shall be taken to the Protector of Chinese, or, if beyond this colony, to the local authority.

7. Ten hours shall constitute a day's work, but in case of emergency the laborer shall work beyond the specified time. Such overtime shall be placed to the credit of the laborer at the rate of wages mentioned in his contract.

8. The customary Chinese festivals will be considered as holidays.

The above eight articles having been clearly explained to both parties by the Protector of Chinese, they have agreed to all of them, and have signed this contract with the understanding that they shall hereafter observe all the articles mentioned therein.

Register No. —; name in English of employee, —; Age, —; Name in Chinese, —; Original country, —; Advance, \$ —; Signature or mark of employee, —.

Office of Protector of Chinese, —, 18—,

— — — — — Employer.

— — — — — Witness.

— — — — — Protector of Chinese.

Coolies introduced into the Dutch possessions must have their contracts filed and registered by their employers with the nearest "resident" or "assistant resident." The Dutch law does not permit coolies to be worked without a contract, and requires a proper enforcement of its stipulations. So long as coolies live up to their contract they cannot be dismissed before its expiration, without the consent of the "resident." This is an important matter to the promoters in case of an unprofitable enterprise. Coolies work under foremen called *mandors*, and distinguished as first, second, third or fourth mandor, according to their ability and duration of service, and according to the number of men under them. In Siak each mandor worked 50 coolies. A mandor's wages vary from \$100 down to \$70, \$60 or \$40 (Mexican money) per month. The mandors are supposed to board themselves; they are paid from one to two months' wages on account, on enrollment. Mandors are picked from among "old or free" coolies. The wages of Chinese blacksmiths (free) vary from \$20 to \$25 per month, and carpenters cost, according to skill, from \$15 to \$25 per month.

To these wages must be added the cost of brokerage, agency, contract drawing, medical examination and other items; also the cost of shipping coolies to their destination and feeding them *en route*. The monthly board, either provided by the employer direct or through a boarding-house boss (*Tauki*), against a fixed charge, must also be included. If a coolie dies during contract time the \$20 purchase money and any part of the \$18 advance not yet worked out is lost to the employer. Moreover, the time lost through sickness of less than 30 days, the cost of medicine administered (see contract), the hospital costs for patients ill more than 30 days and the eventual funeral expenses and loss of clothing supplied are all charges to be considered when the cost of a unit of labor is computed. The time lost during heavy rains (the coolies working out of doors) when calculated for a lot of coolies per year represents a good many days' work. Adding to all this the necessity of breaking in raw coolies for their especial work, we may conclude that coolie labor is more expensive than we might at first have supposed.

The hours of work in Siak are from 7 to 11 a.m. and from 1 to 5 p.m. About 10 minutes are lost each time on going to work and getting ready; the coolie's work is reckoned to commence when he leaves his roof or shelter. Coolies in Siak are paid once a month, nominally \$2.50, but \$1.50 is kept back on account of the advance made at enrollment, leaving the coolie \$1 in cash per month during his year of employment. There are no rates per hour, such as are established for overtime in the Malay Peninsula, where the whole coolie labor system, being of longer standing, is better organized and disciplined than in Siak.

Centrifugal Grinding Machines.

When a grindstone or emery wheel is used for grinding tempered tools, it has been found necessary to have them revolve at a very low rate of speed, or else employ water to keep them from drawing the temper, and many ways have been invented and employed for supplying and applying the water, and none has seemed to become more than half way successful. The difficulties have been that if a wheel or stone was revolved at anything more than a quite moderate speed the moment a drop of water was applied it was bound to fly off. Cases, troughs and coverings have been adopted to catch the water, which have been effectual in this respect, but in regard to keeping the tool cool the result has not been very satisfactory.

The means employed in the centrifugal grinders here illustrated, and which are built by Pedrick & Ayer of Philadelphia, for accomplishing this purpose, constitute a radical departure from anything heretofore resorted to. The water is applied to the stone or wheel at a point near its center, and by capillary attraction is caused to stick to the surface and accumulate in quantity until overcome by centrifugal force imparted by the wheel, then commencing to flow in the direction of the point of its largest diameter, which is entirely encircled by a case which catches the water as it flies off, and without the aid of a pump is conducted back to the tank again. The faster the wheel is revolved the more rapid the water flows, and the ordinary rates of speed and amount of water now used can safely be multiplied several times. And this is not all to be noticed in this connection. The water being made to flow on and over the surface of the wheel with force, at right angle to its direction of motion, it is not so apt to fly off when coming in contact with the tool, but is inclined to keep on its natural direction of course and then the current of water keeps the stone clean and becomes more effectual in keeping the tool cool by being held on the surface at the point of grinding contact.

The horizontal double grinder, Fig. 1, is adapted to machinists' tool grinding and carries two grinding wheels 8 inches by 1½ inch, one at each end of the arbor. The arbor is of steel, 1 inch in diameter, and runs in removable bronze bushings which can be replaced in case of wear. These are self-oiling. The water is carried to the wheels from the tank by head force and back again into the tank by centrifugal force, keeping a continuous circulation as long as enough water is kept in the tank to cover the supply pipes. It is suitable for light and medium grinding and is an effective and substantial machine for tool-room use.

This size is also made up to carry a single wheel, and fitted with short legs for bench use, or stand for floor, as preferred.

Fig. 2 represents an upright grinder carrying a single wheel 12 inches in diameter by 2 inches thick, mounted on a steel arbor 1½ inch in diameter, running in removable bronze bushings. The grinding

* The Chinese Protectors are Government officers, appointed to enforce the fulfillment of labor contracts and to take the part of the wronged party, if occasion requires.

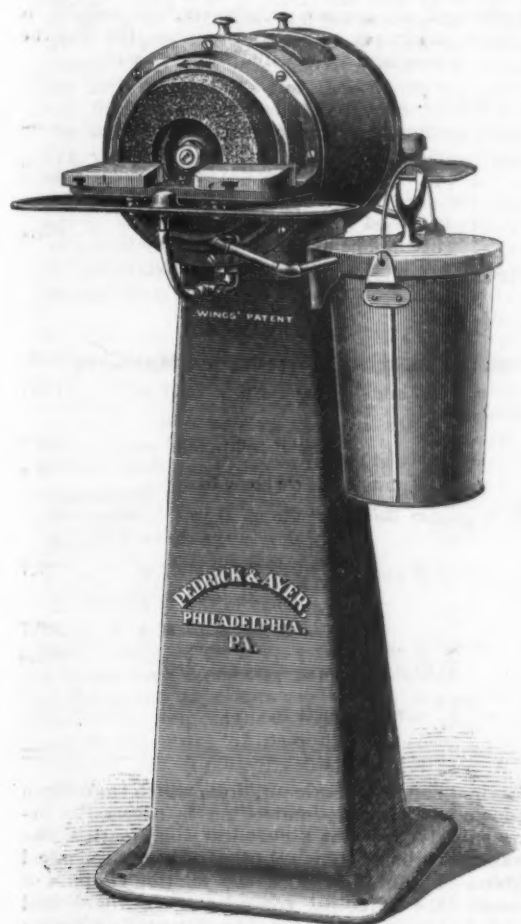


Fig. 1.—Horizontal Double Grinder.



Fig. 2.—Upright Grinder.



Fig. 3.—Gauge and Cutter Grinder.

WINGS' PATENT CENTRIFUGAL GRINDING MACHINE.

face of the wheel is slightly beveled to accommodate the grinding of long knives which have to lay across the wheel from one side to the other. It is designed for grinding all kinds of wood-working tools

having straight edges, like planes, chisels, knives, &c., and is also effective for grinding machinists' and kindred tools. The water is brought on to and carried over the surface of the wheel and back to

the tank again by centrifugal force alone, and so continuously as long as water is kept in the tank. This machine is as simple in its construction as the plainest grindstone frame, supplies itself with an abundant amount of water, and will do better and more work.

The last engraving is of a machine designed for grinding inside gouges, cutters and tools having concave cutting edges, and will grind all such tools to a true arc of a circle within its limits. It supplies itself continuously with an abundant amount of water in the same manner as the horizontal tool grinder. It has steel arbor with removable bronze bushings for boxes, which are self oiling. This machine is made either single or double, as preferred. It is very valuable for grinding, molding and shaping machine cutters used in car shop and planing mills.

The Canda Mfg. Company of New York have purchased a tract of 1000 acres at Cartaret, N. J., 14 miles from the city, upon which they have begun the erection of a large freight car works. H. M. Ensign of Huntington, W. Va., where the same parties already have extensive car works under the name of Ensign Mfg. Company, will be superintendent also of the new works. He has lately spent considerable time traveling over the country investigating the best system of making car wheels and has decided to adopt the Ridgway steam hydraulic system of balanced cranes. A large order has been placed with Craig Ridgway & Son of Coatesville, Pa., for the equipment. The Ridgway system is a hydraulic one, but uses no pumps or accumulator. The cranes are balanced and work quickly and accurately and are very durable. The new works expect to be in operation in part by November 1.

The population of Cleveland, according to the estimate made by the compilers of the city directory, is 299,475.

An Improved Fuel Gas System.

During the past year the Chicago Heat Storage Company have been operating a steam plant of nominally 60 horse-power, for the purpose of publicly demonstrating the efficiency of their new system for the generation and utilization of gaseous fuel. Judging by the results obtained by its continued performance, the system appears capable of important developments in its application to industries of all kinds requiring the use of heat, either as a motive power or in the various processes of manufacture.

Theoretical Considerations.

Fundamentally considered, an apparatus for the generation and utilization of heat should not be treated as involving merely a question of conventional or traditional methods, or a matter of symmetrical design and convenient dimensions. A thorough knowledge is necessary of the chemical and physical phenomena of combustion, and also of elementary theories of heat, in relation to its various effects on different materials. Relative absorption, conductivity, radiation, &c., must be known, in order that their resultant, the conversion of heat into work, may be intelligently calculated. The actual thermal values of the several elements forming the combustible portion of all fuel substances are approximately known (approximately, as having been deduced from actual experiment by numerous accepted authorities there is necessarily some variation as to the results obtained), and thus we have a standard by which to measure comparatively the performance obtained from practical operations.

Combustion is oxidation, or—in its limited sense, as a source of heat—rapid oxidation—that is, the chemical combination in certain unvarying arbitrary proportions of oxygen with another substance. These combining proportions, based on the weight in vacuo, are termed atomic weights, and the number of atoms, volumes or equivalents of each of the elements necessary to effect a given combination is indicated in chemical formulæ by the index figure used with the symbol designating the element. Thus, if we call the atomic weight of hydrogen 1, that of carbon will be 11.97; oxygen, 15.96, and nitrogen, 14.01. As 1 equivalent of oxygen and 2 of hydrogen combine to form water, it is represented by the formula H_2O , and means that the two atoms of hydrogen, weighing 2 pounds, are combined with 1 atom of oxygen, weighing 15.96 = 17.96 pounds of water. An important peculiarity of such combinations, which it is necessary to consider in this connection, is that while the weight of the resultant is the number of equivalents of each element multiplied by its atomic weight, their volume is invariably two after combining, no matter how many equivalents of each may have entered into the combination. Hence it must be borne in mind that in all chemical calculations the quantities must be weights and not volumes, and although the index used with the symbol indicates the number of volumes, they must be reduced to weight by multiplying by the atomic weight; and the atomic weight of the substance, after combination, is the sum of the weights of its constituents. To calculate the number of cubic feet in a given weight of any of the elements or their compounds, we multiply 189.7 (the volume of 1 pound hydrogen at 62° F.) by the number of pounds, and divide by the atomic weight. The quotient will be the desired volume for a simple element, and for compounds multiply by the number of constituent elements.

Thus, by combining 2 volumes of hydrogen with 1 volume of oxygen we have H_2O . of all known substances, its weight is taken as unity, and volume 189.7 as the constant for calculating all others.

Table I.

	Atomic wt.	No. of vols.	Wt. in lbs.	Cub. ft. per lb.	Atomic wt.	Cubic ft.
H_2 , Hydrogen.....	1	2	2	189.7	1	189.7
O , Oxygen.....	15.96	1	15.96	189.7	1	189.7
17.96 atomic weight of water.						
Water. Volume in 1 lb. =	379.4		21.12			
	17.96					
For the oxides of carbon we have:						
C , Carbon.....	11.97	1	11.97	189.7		189.7
				11.97		
O , Oxygen.....	15.96	1	15.96	189.7		189.7
				15.96		379.4
27.93 atomic wt. carbonic oxide.						
CO , Carbonic oxide. Volume in 1 lb. =	379.4		13.58			
	27.93					
C , Carbon.....	11.97	1	11.97	189.7		189.7
				11.97		
O_2 , Oxygen.....	15.96	2	31.92	189.7		189.7
				15.96		379.4
43.89 Atomic wt. Carbonic acid.						
CO_2 Carbonic acid. Volume in 1 lb. =	379.4		8.6375			
	43.89					

As before stated, the combustible elements, carbon and hydrogen, have known calorific values, and we are therefore enabled by the above to ascertain the values of their different compounds or combinations as occurring under ordinary conditions. In the perfect combustion of 1 pound of pure carbon the resultant, as above, being carbonic acid, we see by the formula CO_2 that it is necessary to combine with it two equivalents of oxygen,

$$i. e., \frac{16 \times 2}{12} = 2.66 \text{ pounds, forming 3.66}$$

pounds carbonic acid. According to experiments by Dulong the total heat evolved by this combination is 12,906 heat units. A noticeable feature of the combustion is that in combining with the first atom of oxygen—1.33 pounds—forming carbonic oxide, the amount of heat produced is but 2495 units, while in the conversion from carbonic oxide to carbonic acid the quantity is 12,906 — 2495 = 10,411 units. The cause of this apparent discrepancy is purely a matter of conjecture, but most authorities agree in ascribing it to the conversion of heat into energy, or the mechanical work of changing the solid carbon into the gaseous form. As, therefore, most of the useful effect derived from the combustion of this element has heretofore been in the conversion of the carbonic oxide to carbonic acid or dioxide, it is necessary to ascertain the calorific value of the former, which may be calculated as follows:

Atmospheric air, from which the oxygen to support combustion is necessarily derived, is not a chemical combination like carbonic oxide, but a purely mechanical mixture of which the relative volumes of the principal components—nitrogen and oxygen—vary considerably under different circumstances. It may safely be taken, however, at 4 parts nitrogen to 1 part oxygen, making 5 of air. In order to calculate the volume of air necessary for combustion we must divide the given equivalent of oxygen by

$$\frac{16}{16 + (14 \times 4)} = 0.2222.$$

In calculating the volume of 1 pound of air, we divide 72, the atomic weight, into 189.7 × the number of volumes in the combination, which in this case, unlike that of a chemical combination is 4 + 1 = 5. Thus:

	Volumes.	Atomic weight.	Lbs.
$N_4 + O =$	$\begin{cases} N - 4 \\ O - 1 \end{cases}$	$\begin{cases} \times 14 \\ \times 16 \end{cases}$	$\begin{cases} = 56 \\ = 16 \end{cases}$
	5 volumes		72

atomic weight. Hence $189.7 \times 5 \div 72 = 13.17$ cubic feet per pound.

By experiment the volume of 1 pound at 62° F. is 13.14 cubic feet, which is the figure used in all calculations and shows the assumed formula $N_4 + O$ to be approximately correct.

As all solid fuel substances contain in addition to their combustible a varying percentage of non-combustible elements,

Table II.

	Atomic weights.	Pounds.	Heat units.	Calorific value. Heat units per pound.
CO , Carbonic oxide.....	$\begin{cases} C.....12 \\ O.....16 \end{cases}$	$\begin{cases} = 12 \\ = 16 \end{cases}$	$\begin{cases} \times (12,906 - 2495) \\ \times 28 \end{cases}$	$\begin{cases} = 4462 \end{cases}$
		28	Atomic weight, generally used.	

This agrees very closely with the result of Dulong's experiments, which is given as 4478 units.

In Table III, page 289, are given the various elements and their several combinations incident to combustion, together with their atomic weights, volumes and calorific values. For convenience in calculation the atomic weights generally used are oxygen, 16; carbon, 12, and nitrogen, 14. Hydrogen being the lightest

the latter must obviously have a marked effect on the calorific value of the fuel—aside from the mere reduction in quantity of the former. By an average of results of the analyses of 97 different coals by De la Bèche and Playfair, we have: Carbon, 0.804; hydrogen, 0.0519; oxygen, 0.0787; nitrogen and sulphur, 0.0246; Ash, 0.0408. Nearly all hydrocarbons contain oxygen, and most natural coals have also nitrogen and sulphur. Coke and charcoal,

being artificial fuels, are deprived of their volatile elements by the partial distillation necessary to their production, and their non-combustible elements, therefore, are those which form their respective percentages of ash. Oxygen in a fuel containing hydrogen causes a very material reduction of the available percentage of the latter, by uniting with it to form water, without giving any useful calorific effect. As we have seen, the atomic weight of hydrogen being 1 and that of oxygen 16, and as the combining proportion, by volume, is 2 of hydrogen to 1 of oxygen, the proportion by weight is 1 to 8, and may be expressed $H - \frac{0}{8} =$ available hydrogen.

Sulphur, by combining with atmospheric oxygen, becomes primarily sulphurous acid, and ultimately, by absorption of moisture from the air, sulphuric acid.

Table III.

Combustible elements.	Formula.	Sym- bol.	Atomic wt.	No. of atoms.	Weight in lbs.	Heat units.	Calorific value. Heat units per lb.
Hydrogen.....		H	1	..			62,535
Carbon.....		C	12	..			12,906
Carbonic oxide. CO.....		C	12	1	12	$\times \frac{12,906 - 2495}{28} =$	4,462
		O	16	1	16		
					28	Atomic wt. Vol. $\frac{379.4}{28} =$	13.55
Marsh gas. CH ₄		C	12	1	12	$\times 12,906 = 154,872$	405,012
		H	1	4	4	$\times 62,535 = 250,140$	
					16	Atomic wt. Vol. $\frac{379.4}{16} =$	25.313
Hydrocarbon vapor. C ₂ H ₄		C	12	2	24	$\times 12,906 = 309,744$	559,884
		H	1	4	4	$\times 62,535 = 250,140$	
					28	Atomic wt. Vol. $\frac{379.4}{28} =$	19,996
					16	Atomic wt. Vol. $\frac{379.4}{16} =$	27.1
					28	Atomic wt. Vol. $\frac{379.4}{28} =$	13.55
Non-combustible elements.							
Nitrogen.....		N	14		12		
Oxygen.....		O	16		32		
Carbonic acid. CO ₂		C	12	1	12		379.4
		O	16	2	32		
					44	Atomic wt. Vol. $\frac{379.4}{44} =$	8.623
Water. H ₂ O.....		H	1	2	2		379.4
		O	16	1	16		
					18	Atomic wt. Vol. $\frac{379.4}{18} =$	21.28
Air. N ₄ + O...		N	14	4	56		189.7
		O	16	1	16		
					72	Atomic wt. Vol. $\frac{189.7 \times 5}{72} =$	13.17

This is the most active if not the only injurious element in the smoke from bituminous coals.

The nitrogen has no other effect on the combustion than the absorption of a certain number of units of the sensible heat, ultimately dependent on the temperature at which the products of combustion are discharged into the chimney. This quantity may be disregarded in the present connection.

The calorific value of coal according to the above analyses, is therefore :

	Heat units.
Carbon 0.804 × 12,906 =	10,376.424
Hydrogen (0.0519 - $\frac{0.0787}{8}$ = 0.0421) × 62,535 =	2,632.724

Total per pound of coal..... 14,009.148

In order to effect the combustion of 1 pound of this coal to develop the above 14,009 heat units, the quantity of air necessary to furnish the required oxygen is found to be:

$$\text{Carbon } 0.804 \text{ lb. to carbon dioxide} = \frac{16 \times 2}{12} \times 0.804 = 0.604 \text{ lbs.} \times 13.14 = 126.2$$

$$\text{Hydrogen } 0.0519 - \frac{0.0787}{8} = 0.0421 \text{ lbs. to water } \frac{16}{2} \times 0.0421 = 1.516 \text{ lbs.} \times 13.14 = 19.92$$

Total cubic feet of air at 63° F., 146.12

This, of course, is the theoretical quantity of air. In practice it is impossible to effect the perfect combination of all the atmospheric oxygen with the carbon and hydrogen of the fuel, but that system of heat production which will most closely approximate the theoretical requirements is the desideratum under consideration. The several sources of loss in efficiency of the fuel in the production of heat, are :

1. Insufficient supply of oxygen, permitting some of the inflammable products of distillation to pass, uncombined, to the chimney, thereby entailing the loss of all of their heat value.
2. Too great a supply of oxygen, thereby causing a waste of heat by uselessly raising the temperature of the 80 per cent. nitrogen, as well as the oxygen contained in the excess volume of air passing to the flue.

3. The manner of admitting the air, whereby the supply of oxygen, although in proper quantity, fails to combine with the carbon and hydrogen, and therefore uniting the wasteful results of the other two defects.

We can calculate with sufficient accuracy the total proper quantity of air to be supplied, but it is of equal importance to see that its admission to the furnace is so regulated as not to cause an excess at one point of the furnace, thereby chilling the inflammable products of combustion to below the temperature of ignition, so that when they, together with the unconsumed oxygen, pass on to that portion of the furnace in which they should combine to produce flame, they are too cold to effect the combination.

In the utilization of heat, also, the sources of loss are numerous, but may be included in two generic causes, viz.: Radiation from exposed surfaces and passage of the waste products of combustion to the chimney at too high a temperature. Both causes produce serious loss.

Although the foregoing applies to the use of fuel in furnaces of all kinds and for all purposes, we may consider that of a steam boiler as being, in all essential points, a fair exponent of the various types. Whether for metallurgical operations, glass making, brick and pottery burning, or the generation of steam, all must be considered from the same standpoint—in one respect, at least—that the best furnace is the one which, without

loss of efficiency, will give the highest degree of economy. By economy is meant not the performance giving the greatest percentage of the theoretical calorific value of the fuel, regardless of the incidental conditions, but the highest net return. A furnace may be capable of utilizing, say, 10 per cent. more of the actual fuel value than another, and yet this gain be neutralized by an extra cost of 10 per cent. necessary to attain the above result, in which case it would be less economical, as requiring a greater outlay to produce the same net return.

Water possesses certain physical properties which form the basis of the British thermal unit, and as this substance affords by far the most convenient medium for the necessary manipulations and accurate measurement of results we could not devise a more satisfactory basis of comparative efficiency—assuming its specific heat to be the same at all temperatures. The following table gives the calorific values of the combustible elements and their ordinary combinations, in heat units (as per previous table), obtained from experiment; and in pounds of water evaporated from and at 212° F. at atmospheric pressure; the latter, by calculation, being a theoretical deduction from the former, supposing the entire quantity of heat to be absorbed by the water. While this is impossible in practice, it affords a perfect standard with which to compare the ascertained efficiency. As Regnault has found the latent heat of vaporization to be a quantity sufficient to have raised the temperature 966°, had it not become latent, we use this number as a constant by which to divide the calorific value in heat units, to obtain the equivalent evaporation value. This applies only to supply and evaporation at 212°. Should the water be fed at a lower temperature, the divisor would be 966 + the difference between that temperature and 212°. Thus, with feed water at 62° and evaporation at atmospheric pressure, the divisor would be 966 + 212 - 62 = 1116. The latent heat of vaporization decreases, too, as the pressure and consequently the temperature increases. At 60 pounds gauge pressure the temperature is 307°, and the latent heat of vaporization becomes 897, instead of 966; hence, with feed at 62° and evaporation at 60 pounds pressure, the divisor is 897 + 212 - 62 = 1047. Where very accurate calculations are necessary, we must consider the fact that the specific heat of water varies slightly at different temperatures. While at 32° it is unity, at 212° it becomes 1.013; therefore, the divisor 1047 would be modified by the mean specific heat due to the entire range of temperature from 62° to 307°. In the present connection this quantity may be disregarded, as it is merely a question of comparison on a uniform basis.

	Heat units per pound of fuel.	Constant.	Pounds water evaporated per pound
Carbon.....	12,906	÷ 966	= 13.36
Carbonic oxide (CO).....	4,462	÷ 966	= 4.62
Hydrogen.....	62,535	÷ 966	= 64.74
Marsh gas (CH ₄).....	25,300	÷ 966	= 26.106
Hydrocarbon vapor (C ₂ H ₄).....	10,936	÷ 966	= 20.68
Carbon { 1 pound in form of carbonic oxide. }	10,411	÷ 966	= 10.777

From the foregoing we find the possible theoretical evaporation from 1 pound average coal, as per the analyses, to be 14,009 ÷ 966 = 14.5 pounds water from and at 212°. This will serve as a constant with which to compare the extravagant results so often claimed for alleged improvements in furnaces, boilers and other steam appliances in which the performance is given as greater than the actual possibilities.

Furnaces for burning solid fuel on a grate in the furnace proper are of two types—hand firing and mechanical firing. In both cases the fuel fed to the grate forms a fire bed of certain calculated superficial proportions of so many square feet of grate surface per horse-power on the nominal rating on the boiler. The actual efficiency realized may vary 50 per cent. or more with the same fuel, being dependent on the skill of the fireman or the action of the mechanical device employed. Absorption of heat by the boiler and its contents may be considered as from three sources—namely, by radiation, from the fire bed and the heated brick work of the furnace; by contact, from the flame generally beyond the bridge wall, and from the hot gases beyond the flame. Usually all, or nearly all, of the air supply is through the grate and fire bed—thus if the fire be thin giving an intense and wasteful combustion and consequently high temperature at this point, and comparatively little effect beyond, or with a thick fire bed a slower rate of combustion and a waste of a large percentage of the gaseous portions of the fuel (smoke or free carbon and carbonic oxide), due to the difficulty of obtaining a sufficient air supply through the heavy mass of incandescent fuel.

The formation of smoke is caused by the failure of the carbon contained in the volatile portions of the fuel (which are liberated at a comparatively low temperature) to combine with the necessary equivalent of oxygen to form carbonic oxide. This would be impossible if the temperature and air supply were sufficient, as the carbon atom would be seized upon, immediately it was set free, by the first atom of oxygen, and if combined with the second also, converting it to carbonic acid, it would again take up an equivalent of carbon, in its passage, at a point where the combustion was less rapid.

The problem of abatement of the smoke nuisance in large cities is therefore one not of a smoke burner, but a smoke preventer. Another source of serious loss, where hand firing is employed, is the necessity for opening the furnace door at short intervals for supplying fuel and "working" the fire. This admits large volumes of cold air, which completely checks the secondary combustion for the time, and cools down the interior of the furnace and flues to a very serious extent. The effect on the boiler also is very damaging, owing to the continual and unequal expansion and contraction of the metal, caused by the excessive variations of temperature. Where mechanical stokers are used the fuel is fed automatically and continuously to the grate, and thus the evils due to the opening of fire doors are avoided. A greater degree of perfection in combustion of the fuel, too, is attained. The mechanical stoker may be considered as an undoubted improvement, and one of the most efficient means possible for firing solid fuel.

The necessity for improvement over the method of hand firing in large metallurgical furnaces has led to the introduction of separate gas producers for furnishing to the furnace proper the products of distillation or partial combustion. The well known Siemens gas furnace is an example of this type, and so successful were the results obtained from its use, even in its somewhat crude original form, that its adoption has become very general in this class of manufacture. In its original form the producer is simply a brick chamber, having at bottom a grate for admission of air and at top a charging hopper and vertical gas flue or uptake, the latter forming the connection to a horizontal flue at a height of 8 or 10 feet, which, after extending a sufficient distance to effect by radiation a cooling of the gas of about 300°, again connects with the downtake and

furnace flue. The fuel bed, of about 3 feet thickness, is fed by charges from the hopper, placed to one side, out of the vertical line of the grate. Combustion is effected by forcing air through the incandescent fuel, which burns slowly, that nearest the grate (having a sufficiently high temperature in the presence of an excess of oxygen) being converted into carbonic acid, which in rising through the mass of incandescent fuel is reduced to carbonic oxide. This, together with the hydrogen and volatile hydrocarbons, which are set free at a much lower temperature from the upper portion of the fuel bed, pass through the gas flue to the furnace, losing, as stated, 300° of the sensible heat at which they left the producer. A source of considerable loss in fuel value is experienced from the condensation of a portion of the bituminous constituents of the distillate in the form of coal tar. This is shown to amount to as much as from 7.5 to 12.5 per cent. of the total weight of coal charged, and in addition to this loss it causes much trouble and annoyance by fouling the gas flues from producer to furnace to such an extent as to require special means for its removal. The performance of this producer may be calculated from the following analysis by Siemens of the gas produced from a mixture of three parts coking and one part non coking coals. The quantities are given by volume:

	Cubic feet.
Combustible gases:	
Hydrogen.....	8.2
Carbonic oxide.....	24.2
Marsh gas and other hydrocarbons..	2.2
Incombustible gases:	
Carbonic acid.....	4.2
Nitrogen.....	61.2
Total.....	100.00

Reducing these to their calorific values, we have, in 1000 cubic feet of the gas (assuming the item marsh gas and other hydrocarbons to be 3 and 1 respectively):

	Cubic feet.	Vol. per pound.	Weight in pounds.	Calorific value.	Heat units.	Pounds water evaporated.
Hydrogen.....	82	189.7	0.4333	62,535	28,096	906 = 29.09
Carbonic oxide.....	242	13.58	17.82	4,462	79,513	906 = 8.21
Marsh gas.....	16	23.71	0.6748	25,313	17,081	906 = 17.68
Heavy hydrocarbons..	6	13.55	0.443	19,906	8,858	906 = 9.17
Total calorific and evaporative values.....					133,548	64.15
Carbonic acid.....	42					
Nitrogen.....	612					
	1000 cubic feet.					

We have seen that in the conversion of 1 pound carbon to carbonic oxide the heat evolved is 2495 units, while the total heat due to its complete combustion to carbonic acid is 12,906. As the analysis shows no constituent which can render this first quantity available in the furnace, we

must consider as lost $\frac{2495}{12,906} = 19.255$ per cent. of the total carbon value of the coal. Of course the sensible heat developed by this primary combustion serves to raise the temperature of the entire volume of the gases, but as it is necessary to reduce this temperature 300°, we must consider the whole of it as lost. It became necessary to increase the economy by providing some means whereby a portion, at least, of this heat might be rendered available. The admission of water vapor or steam with the air supply through the grate was adopted, with marked results. By passing through the fuel bed in contact with the incandescent carbon the water becomes decomposed, the reaction being expressed by the formula $H_2O + C = H_2 + CO$, or 2 volumes of hydrogen and 1 of carbonic oxide.

(To be continued.)

Details of the Danks Rivet Machine.

Perspective views of this machine were presented in our issue of July 30. As the machine has attracted considerable attention, we deem it advisable to now present views showing the principal details of its construction and a complete description of the operation. The rods from which the rivets are formed are automatically introduced into the dies cut to proper blank length, the heads formed and the completed rivets ejected. The mechanism by means of which this is accomplished is exceedingly simple in construction, accurate in its operation, powerful and not apt to get out of order.

The machine is driven by the pulley P, mounted on the driving shaft S', upon the opposite end of which is a crank disk driving through the connection C the disk wheel shaft S''. Pivoted at its upper end to the lower end of the crank C is a latch pawl, L, whose other end is connected to the die wheel shaft outside of the ratchet wheel R. This latch pawl is arranged to operate in an opening, Fig. 3, made in the pawl arm, and is attached to the inner face of a leaf spring which is secured to the arm, as shown in the drawing. The pawl proper is adapted to move in the opening as passing along over the bevels formed in the side face of the ratchet. This ratchet has four stops or teeth on its side face, and as the pawl arm is operated by the crank and pawl proper, at each revolution of the main shaft it engages with one of these stops to move the die wheel ratchet one-quarter of a turn, and then reciprocatingly move to engage with another ratchet stop. The pawl dog D is arranged to engage with one of the peripheral teeth formed on the ratchet, the function of this dog being that of a detent to make positive the periodic stops of the die wheel and to insure accuracy in the po-

Table IV.

sition of the wheel relatively to the swaging die.

In the machine illustrated the die wheel W, shown in the perspective, Fig. 1, and the vertical section, Fig. 2, has four dies, D², arranged in recesses made in its outer face, the die stocks being placed in the outer face of the wheel on a line parallel to the axis of the latter and so as to be diametrically opposite. A section of one of the rivet dies is shown removed from the die wheel in Fig. 4. On the driving shaft is a cam operating the header H, which is arranged to move in slides made in the frame of the machine. This header has formed within its lower end a recess to receive a heading die made with a series of sinks corresponding in number to the number of passages or openings made in each of the rivet dies. Each of these sinks, as shown in Fig. 2, has the form of the rivet head, so that when the header descends these sinks are so shaped and arranged that each of them will engage with the outer end of one of the rivet blanks, where projecting from each of the die passages, and in descending will swage on the blank a head corresponding to the form of the sink. This header is operated

by the cam to engage with the heads of the rivet blanks in one of the die holders at each revolution of the main shaft. The F-shaped lever shown to the left in Fig. 2 is made at its upper end with a curved head, and is formed at its center with an inwardly projecting arm, adapted to enter a recess made in the rear face of the header. The lower end of this lever is connected by a spring with the frame. When the header, descends the lever is moved against the tension of the spring, due to the en-

blanks from the ends of the rods. After the passage of the lugs the blade falls by gravity to its lowest position. The rods are fed to the machine by the rolls RR, operated by the sprocket belt B⁴. On the driving pulley P is a cam C⁶ which at each revolution of the pulley, makes a traction engagement to operate the belt, and the two rolls are thus caused to move the rods into the rivet blanks at certain intervals. The plungers I move outwardly in their recess made in the die wheel from

It will be seen from the foregoing that when power is applied to the pulley P the cam formed on it will so operate as to feed, by means of the rollers, the rods of iron that have been heated to enter the die sinks or passages in that particular die stock which is in line with the rods. While in this position the blade is operated by the die wheel to raise and cut from the ends of the rods the proper blank lengths, when the die wheel making another quarter turn brings the die stocks

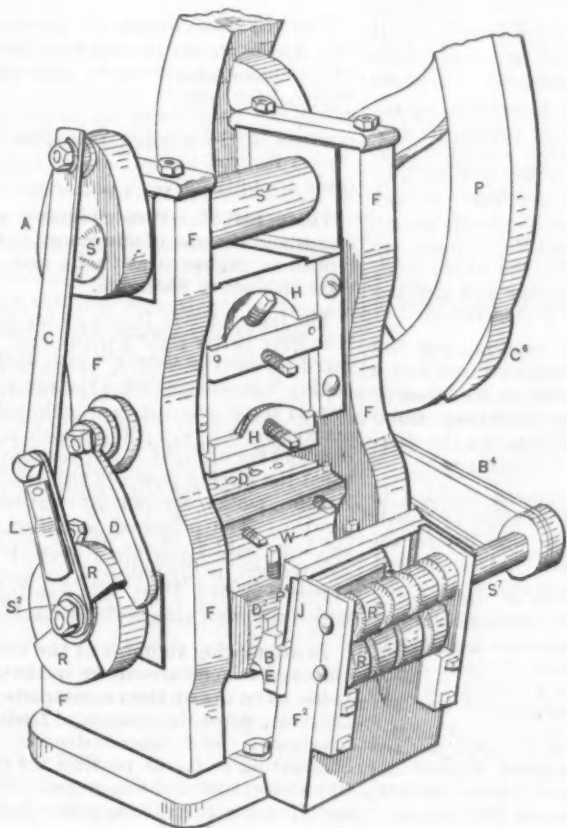


Fig. 1.—Perspective.

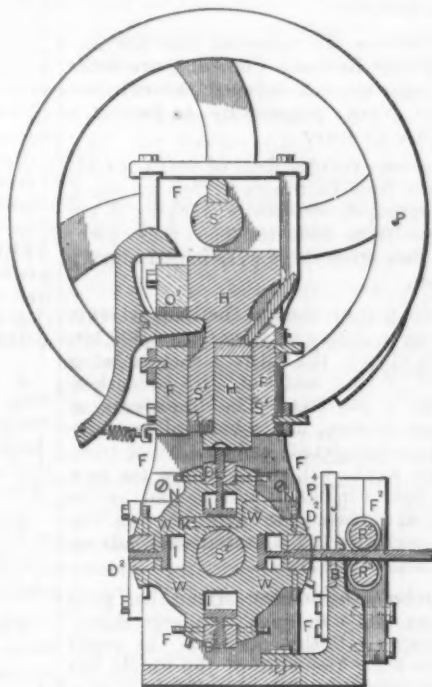


Fig. 2.—Vertical Section.



Fig. 4.—Section of Rivet Die.

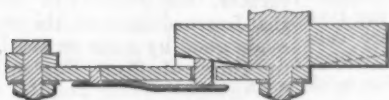


Fig. 3.—Latch Pawl.

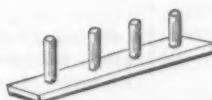


Fig. 6.—Plunger.

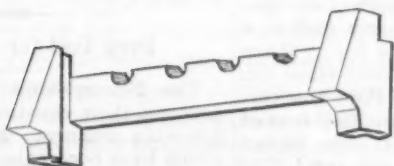


Fig. 5.—Cutting Blade.

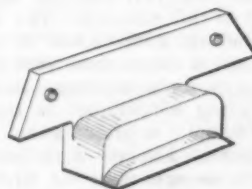


Fig. 7.—Cam Operating Plungers.

DETAILS OF THE DANKS RIVET MACHINE.

gagement of its arm with the recess in the header and when the operation of the cam ceases then the action of the spring is brought into play to move the lever and thereby cause the header to raise to its normal position away from the rivets. The cutting blade B, shown detached in Fig. 5, is adapted to be moved in vertical slides, J, made in each side of the frame extension. It makes a shear engagement with the outer edge of the plate P⁴ when raised up. The upper edge of this plate is made with recesses that bevel upwardly and inwardly with a uniform concavity. As the die wheel turns, lugs formed on it engage with one of the lips formed on each end, E, of the blade to move it vertically in its slides so as to cut off the rivet

side to side thereof in line with its axis. Each of these plungers is constructed with a series of pins Fig. 6, corresponding in number to the number of die passages and which serve to eject the finished rivets. The ends of the blanks extend beyond the sides of the die wheel, so as to engage with the cam on the plate shown detached in Fig. 7, one of these plates being attached to the frame upon each of its opposite and inner sides, one of them being shown in position at N in Fig. 2. As the revolution of the die wheel brings the ends of the plungers in contact with the cam on the plate N at each side of the frame, the pins carried by the plunger pass through the die passages and force the rivets out.

containing the blanks uppermost on the die wheel, the header descends to put on the heads and then recedes, and while the die wheel is making another quarter turn, the plunger is operated to force out the finished rivets.

As before mentioned, this machine at each quarter revolution of the die wheel completes four rivets, its capacity being stated to be at least six times more than any other machine made. It is apparent that as the operations follow one another so closely, and as the mechanism by means of which the several movements are performed is so simple and reliable, there is little danger of derangement of parts.

The machine is controlled by the American Bolt and Rivet Company, organized

under the laws of West Virginia. Additional information can be obtained from the Hunt Engineering Company of Brooklyn, N. Y.

THE WEEK.

The Morgan liner *El Dorado*, from this port for New Orleans, struck an unknown rock off Great Isaac's Shoal and was run ashore. Estimated value of ship and cargo, \$400,000.

Indications are apparent that the Lehigh Valley Railroad Company are seeking a separate and independent entrance to New York, preparatory to having a ferry of their own.

Seventeen regular lines of ocean steamers trade from Baltimore to foreign ports, representing 60 steamships, ranging in net tonnage from 1800 to 6000 tons each. Three new steamships were added during the year.

The new train shed of the Pennsylvania Railroad in Jersey City contains 4,500,000 pounds of iron, the entire structure being formed of that material. Its dimensions are 652 x 256 feet. The framework of the new station, for which plans have been just completed, will also be of iron. But few weeks will elapse before the new screw boat Cincinnati will be put on the route, and passengers pass out on the same level with the elevated railroads on either side of the river.

Watchmaking in Switzerland has gone from private dwellings into large manufacturing establishments, with the result of decreasing the cost of the watch, but greatly increasing the sale, which is now estimated at \$20,000,000 per annum. Wages have also increased.

The bark *Louise Adelaide* cleared from Philadelphia for Brazil with a cargo of railroad machinery valued at over \$150,000. It is intended for the new railroads building in that country by English capitalists, who prefer the American rolling stock to any other.

The Sioux Indians object to receiving plows and harrows in payment for lands ceded to the United States. To get the money they must use the tools.

The fact should be specially noted that the foreign commerce of the United States during the last fiscal year was the largest in the history of this country. The total exports, including \$86,363,622 in gold and \$22,365,666 in silver, were \$993,000,000—almost a thousand millions—and the imports, including \$36,000,000 in specie, were \$881,000,000, approximating nine hundred millions. Exports and imports together make an aggregate of \$1,874,000,000 as compared with only \$482,000,000 at the close of the war. The thousand millions figure was passed for the first time in 1871.

Two steel stern-wheel steamers are to be built by The Pusey & Jones Company of Wilmington, for Carthage, United States of Colombia. They will be shipped in pieces and put together at their destination.

A war between Salvador and the Pacific Mail Steamship Company, provoked by the seizure of a steamer at Libertad, August 10, was ended by the ship getting up steam and running away.

Over 1,000,000 bushels of rye having been sold in this market for future delivery a "corner" of unusual dimensions has been created by the sudden advance in prices, equal to at least 10 cents per bushel within a short period and 30 cents since the season opened. This event is something unprecedented and is due to the great deficiency in the crop of

Europe and to the action of the Russian Government in prohibiting exports from that country. Rye in the European markets is now dearer than wheat.

The relative commercial importance of American cities which are most largely engaged in the foreign trade is indicated by the statement of imports and exports, exclusive of specie, for the year ending June 30. The comparison is as follows:

	Imports.	Exports.
New York.....	\$537,786,007	\$346,528,847
Boston.....	71,212,614	77,020,081
Philadelphia.....	59,427,890	33,674,355
San Francisco.....	50,943,209	40,168,771
Baltimore.....	20,555,687	64,412,247
New Orleans.....	20,267,060	109,106,687
Chicago.....	15,303,373	2,340,020

Several other cities are important on account of their exports of cotton, Galveston and Savannah having exported merchandise valued at over \$33,500,000 and Charleston nearly \$21,000,000. In the foregoing table the New York exports are less by \$100,075,068, and the imports are less by \$15,402,705 than the whole total, that being the specie leaving and arriving at this port during the period stated.

A mammoth freight station, 705 feet long, covered with corrugated iron and a metal roof, will be erected in St. Louis by the Pennsylvania Railroad Company, and is similar to another building by the Merchants' Bridge Terminal Company.

The Japanese Government decided to defend Corea in case of invasion by Russia or China. Perhaps that was before the visit of the Chinese fleet.

The Russian prohibition of the exportation of rye, upon which Germany so largely depends, is expected to cause a clamor in the domain of Emperor William for a reduction of grain duties, which will be cheering to American farmers.

The tax rate of Boston for 1891 is fixed at \$12.60 per \$1000, against \$13.30 last year. The total valuation is \$855,066,114, an increase over last year of \$33,040,14.

The work of completing the enlarged locks at the Sault Ste. Marie ship canal on Lake Superior is watched with unusual interest along the whole line of the lake ports and by manufacturers who are concerned in the transportation of ore. After two years of labor in excavating, the work of construction is about to commence. The entire cost is estimated by Engineer Poe at \$4,585,000, of which \$350,000 is for lock gates and machinery. This season a boat trading between Lake Superior and Lake Erie ports can load to a depth of but a little over 14 feet. When the canal is completed the same vessel can load to 19 feet. The E. C. Pope now carries through the canal about 3000 tons of ore on a draft of 14 feet. On 16 feet alone it is estimated she will carry 3750 tons, and on 19 feet she would probably carry 4800 tons. With the freight on ore \$1 per ton, a low estimate, this increased draft means a gain to her owners of \$1800 on a single down trip. Even the uninterested can see at once the enormous advantage accruing to the lake carrying industry from this improved state of affairs. The opening of the new lock to traffic will be a day of jubilee all over the great lakes. Lake shipbuilding will be infused with a new life.

The Georgia legislature voted to ask Congress to appropriate \$3,000,000 for the improvement of Savannah river.

An observer of "bursting Southern booms," who has been traveling extensively, while further convinced of the hopeless collapse of many boom towns in the Southern States, is yet more fully persuaded than ever before of the continued permanent industrial development of that section and of its rapid growth in population. The miscarriage of plans in most

instances is attributed to the incompetency of managers and to downright swindling.

The wheat crop of Argentine for 1891 is estimated at 501,000 tons, which is an unusually large yield, equivalent to 15 bushels per acre. The wheat area has nearly doubled in seven years. The estimated value is \$100 per ton. Maize, at \$67 per ton, will yield \$1,200,000 reduced to a gold basis. The total crop product, including linseed and sundries, is valued at over \$15,000,000.

The Halifax Board of Trade fearful that American reciprocity with Spain will ruin Canadian exporters to Spanish West Indies, have passed resolutions intended to call the attention of the Imperial Government to the alleged disregard of the "most favored nation" clause in the new trade arrangements.

There are 31 cotton spinning mills in Japan and the manufacturers expect to establish an exchange at Osaka and export their product to Shanghai.

The trade of San Domingo for the last year gave better results than were anticipated, exports of coffee, cocoa and sugar having increased, but for the future of the import trade prospects are not hopeful, the market having been glutted with merchandise and the drought of last year has diminished the buying power of the inhabitants. Public works are almost entirely suspended. The principal condition of the last loan, said to have been contracted at Amsterdam, is the building of a railroad between Porto Plata and Santiago, for which materials are arriving from Antwerp.

In attempting to judge of the volume of current business erroneous inferences are liable to be drawn from a comparison with last year, when the amount of trading was exceptional and unprecedented. After eliminating so far as possible the speculative element from the aggregate of Clearing House returns, it appears that in the current year the lessened production of iron is offset in the larger consumption in cotton, wool and coal. And it appears further, from a survey of the entire field, that lessened trade in the South has been made good by gains on the Pacific Coast, in parts of New England and in the Northwest. Thus, despite a partial failure of the crops last season, the volume of business thus far in 1891 is somewhat in excess of any former year, with the single exception noted.

Drop Test for Car Wheels.

The Pennsylvania Railroad Company now test their cast-iron car wheels in the following manner: For each 50 wheels which have been shipped or are ready to ship, one wheel shall be taken at random by the railroad company's inspector—either at the railroad company's shops or at the car wheel manufacturer's, as the case may be—and subjected to the following test: The wheel shall be placed flange downward on an anvil block weighing 1700 pounds, set on rubble masonry 2 feet deep and having three supports not more than 5 inches wide for the wheel to rest upon. It shall be struck centrally on the hub by a weight of 140 pounds, falling from a height of 12 feet. Should the wheel break in two or more pieces after eight blows, or less, the 50 wheels represented by it will be rejected; if, however, the wheel stands eight blows without breaking in two or more pieces the 50 wheels will be accepted. The wheel for test to be furnished by the manufacturer in addition to the 50 wheels ordered.

Representatives of an English firm of auditors have just made a report on the Otis Steel Company.

The Iron Age

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The Consumption of Old Rails.

The increasing scarcity of old iron rails in the West is having the effect of cutting off their consumption almost entirely in the manufacture of bar iron. The movement in this direction has, of course, been perceptible for some time, but not until this year have old rails practically ceased to be a factor in the line of raw material for bar mills. Quite a number of such concerns, which were once among the heaviest purchasers, are known to have used none whatever for several months, and their managers state that they expect never to return to them. Pig and scrap iron will hereafter have undisputed sway in the manufacture of bar iron, probably to the greater satisfaction of consumers, who, however, find that prices maintain themselves on a higher level than when old rails were plentiful and cheap. The heavy demand for muck bar, which has been such a feature of the Western iron market for the past year or two, was undoubtedly due to a considerable extent to the gradual abandonment of the use of old rails, and as soon as the market resumes its normal tone a repetition of the heavy trade in muck bar is to be expected. At present almost the only buyers of old iron rails are the manufacturers of fish plates and railroad spikes, whose requirements are about equal to the supply coming forward. Should the demand for their products materially increase, even they would probably experience considerable difficulty in securing stock with accustomed regularity.

The supply of old steel rails is increasing, but not so rapidly as might be expected with the enormous mileage of steel track now in use. As the supply grows, however, new uses are continually being found for them. If they could be remanufactured as easily as old iron rails, there is no doubt that the demand would be strong enough to make them much higher in price. The special treatment to which they must be subjected under the methods hitherto followed has limited the number of purchasers and kept down the price. But this cheapness is stimulating the efforts of inventors to devise means of remanufacturing them readily. Some of the latest methods employed are so ingenious that the time appears near at hand when old steel rails will be sought for. The McCloud process, now in use in several Western mills, rolls an old steel rail or a steel rail crop end into a flat bar or plate in five passes at one heat, without overlapping the metal in either the head or the flange. The bar or

plate is then suitable for a variety of purposes. Slitting the rail is thus rendered unnecessary, and the way has been opened for a much wider use of old steel rails. The character of the material will, of course, restrict the uses to which old steel rail metal can be put. Old steel rails will therefore be unable to completely fill the place left vacant by old iron rails, but they are certainly in a fair way to accomplish much more in that line than was deemed probable but a few years since. At the same time it is not at all unlikely that rerolled old steel rails will go into some forms for which old iron rails were never deemed suitable.

Importing Workmen Under Contract.

The Niedringhaus case at St. Louis brings up a phase of the contract labor question which is somewhat perplexing, but nevertheless seems capable of satisfactory solution. The trades unions were instrumental in having the law passed which prohibits the importation of labor under contract, and they are, of course, desirous of its strict enforcement without regard to other interests involved. In this rigid interpretation of the act they lose sight of the great abuses originally aimed at, and which, through it, have been subjected to a wholesome check, if not completely corrected. It is hazardous for an employer now to send abroad and hire a complete force of men to take the place of his old workmen who have refused to accept lower wages. It is also exceedingly difficult, if not impossible, for a foreign speculator in human labor to excite the cupidity of an employer in the United States by offering him workmen willing to take rates of wages far below the American standard. The penalties imposed for violations of the law are too severe to be lightly invoked. With a great reform accomplished, the leaders of the trades unions are now in danger of bringing the law, with its beneficent purposes, into disrepute with the public generally, by seeking to have it enforced indiscriminately in the case of single servants engaged abroad and very small groups of men hired for special purposes by citizens who have no special intention of displacing domestic labor. The recent prosecution of a citizen of Illinois who brought back with him to this country a foreigner, in charge of some horses he was importing, and the threatened prosecution of another citizen of the same State for importing two Japanese jinricksha runners, are instances in point. Cannons are not constructed to slaughter mice.

Now, in the case of the St. Louis tin-plate enterprise, the trades unions are reported to be up in arms and threaten direful things if the administration at Washington permits expert workmen to be engaged and taken to St. Louis from across the sea. The exigencies of partisan politics may make the administration yield to them and endeavor to prevent the importation of Welsh tin-plate workers under contract, but a business-like view of the situation would seem to call for permission

to import such workmen. The tin-plate industry is most emphatically a new industry, and those who are starting works are undoubtedly finding it a matter of considerable difficulty to collect a sufficient force of expert workmen at first to enable them to start off smoothly. The efforts made in some quarters to belound this case, by impaling ex-Congressman Niedringhaus on one or the other horns of a dilemma, are an amusing incident of its literature, but are not to be seriously considered. It cannot be denied that he has made tin plate in an experimental way, and is now completing works to turn out tin plate on a commercial scale. He insists that he needs some skilled workmen, perhaps 10 per cent. of the whole force to be employed in his tin-plate department. The offer he has made to tin-plate workers now in America and engaged in other avocations, to pay them 100 per cent. more than is paid for similar work abroad, would seem to be quite liberal, but it is not enough evidently to attract them from occupations in which they have by this time permanently settled.

The Amalgamated Association would render its membership an important service at this time, if it should endeavor by every means possible to encourage the efforts of those who are risking their capital in establishing tin-plate works. The development of this industry, if properly fostered by all interests involved, will in time employ large numbers of American workmen, compared with whom the Welsh workmen who might now be brought hither would be insignificant. The sudden transfer of the entire Welsh tin-plate community to this country is not to be feared. Nor is the lowering of the American standard of wages to the Welsh standard, or anything like it, to be feared. American manufacturers expect to pay considerably more than their foreign competitors, but it is unreasonable for the trades unions to handicap new industries by imposing upon them higher schedules than in other industries, and also by preventing them from securing the best skilled labor attainable.

Poor's statistics, which have been published lately, indicate that the financial results obtained by the railroads in the year 1890 were considerably better than was generally reported. This may be due to the fact that the aggregates of "Poor's Manual" are from reports of railroads for their fiscal years, so that a considerable portion of the totals cover the results of operations extending over the year ending June 30, 1890. In other words, the effect of the poor crops in certain portions of the country last year have not yet told fully on the statistics which the Manual presents, and similarly the results of this abundant harvest year will not make themselves felt in the report which will be issued a year hence. It is perhaps due to this delay that the showing is better than expected. Including the New York elevated roads, the gross traffic earnings of roads owning 163,430 miles in 1890 were \$1,097,847,428, against \$1,002,926,059 on 159,904 miles in 1889, leaving net earnings of \$346,921 -

318 and \$322,122,721, respectively. In 1890 the new construction was 5739 miles, which carried the total mileage to 166,817 miles. Mr. Poor reports that at the end of their present fiscal years, 1890, the railroads of the country had 163,420 miles of road, with 44,883 miles of second tracks, sidings, &c., making the total track 208,303 miles, an increase of 6067 miles during the year. The mileage of steel rails in the tracks increased from 151,722 to 167,606 miles, while the mileage of iron rails decreased from 50,513 to 40,697 miles. In other words, 15,700 miles of steel rails were laid, of which 9886 miles were required for the displacement of iron tracks. It is, of course, impossible to estimate how many miles of steel rails were relaid with new steel rails, yet it is quite clear that the renewal demand played a far more important part than the requirements for new railroads. The fact that the figures are for railroad fiscal years, varying a good deal, makes it impossible to use them in comparisons with the known rail production.

The Rise in Grain.

It is marvelous how the crops have grown in public estimation as a business factor within the last few months. The Western farmer scarcely a year ago was caricatured as an indigent and impecunious person, by whom a mortgage would most acceptably be given as security for a loan at the highest rate of interest. Now the same farmer interposes with his luxurious harvest to save the country from possible financial collapse. It requires no argument now to show that agriculture represents a stupendous interest very near to the foundation of public prosperity. Farm products will be \$1,000,000,000 more this year in the United States than they have been during the recent years of depression. At least this is the estimate put forward by the *American Agriculturist* in its annual review of the harvests. The editor believes that unless unexpected influences wholly change the current of events, the value of corn on the farm will average in December fully 50 cents a bushel, wheat \$1 a bushel and oats at least 40 cents. On this basis the value of the corn crop to the farmers will be \$1,000,000,000, wheat \$500,000,000 and oats \$250,000,000, or a total of \$1,750,000,000. This is \$450,000,000 more than the value of these crops in 1890, and \$625,000,000 more than the value of the average of these crops from 1880 to 1890 inclusive.

The ukase from the Russian Government prohibiting the export of rye created a feeling akin to consternation at Berlin and Vienna, and the reflex influence is quickly felt in the markets of England and the United States, sending the price of this cereal up to a par with wheat and other cereals in sympathy. Besides Scandinavia, Germany and Holland have been largely dependent on Russia for this essential article of food. In this new phase of the situation and in prospect of wheat going to the highest prices in all markets, no alternative remains but to look to other

sources of supply. By this latest development some 20,000,000 more bushels of grain are supposed to be added to the previously estimated requirements of Continental Europe. The necessity is imperative. Speculators are quick to discover their opportunity, and prices advance by leaps and bounds. In New York market last week trading was excited from the start, culminating on Saturday in sales aggregating 11,500,000 bushels, and the cash market, which had previously advanced 9 cents to 10 cents a bushel, jumped still higher. Indian corn went up 6 cents to 6½ cents and rye 10 cents to 15 cents. The principal demand for rye seemed to be from Norway and Sweden.

One important consequence of the growing greed of Europe will come into prominent relief later, when the immense corn crop shall approach maturity. It is already evident that Indian corn, or maize, of which the United States grows over 2,000,000,000 bushels per annum and exported last year over 100,000,000 bushels, must play an important part. The present prospects of this crop are excellent. The proportion usually exported, as appears from the foregoing, is comparatively small, but as an article of food, maize, ever since the period of the Irish famine, has risen in favor as an exportable commodity and shipments may be largely augmented. It is notorious that with short crops and high prices for other cereals, the foreign demand for corn becomes more general, and the season now opening is likely to emphasize this phase of our export trade. Of last year's corn exports one-half went to Great Britain, but at a valuation low almost beyond precedent—less than 42 cents a bushel. With dear wheat and dear rye and Europe impoverished from various causes, corn steps in as the poor man's friend to fill the void.

In the glowing prospect several interesting questions are suggested, perhaps first and most obviously the chances that the blind avarice of those who simply reach out for gain may force prices to an inordinate limit, paralyzing the market by checking the foreign demand. It is well at this time to raise a cautionary signal. Again, what effect will prosperity have on the Western granger? Will it so alloy his discontent that the current of sentiment in favor of "more money" may be turned and the chance of getting a depreciated dollar in silver currency be wholly averted? Once more. Will Europe persist in warlike demonstrations while suffering for want of food, and fill up the ranks of fighting men from those who are needed to till the ground? Disturbing the equilibrium of the food supply in two continents, as readily appears, has far-reaching consequences which human sagacity may be powerless to control. The coincident needs of the Old World and the abundance of the New make America the granary of all nations.

Manufacturers and merchants are deeply interested in the Illinois Anti-Trust law, which went into effect recently. We printed the act in full in *The Iron Age* of

June 4. The law goes a good deal further than any similar legislation, and contains one particularly noteworthy feature in that it makes it possible for a buyer of goods to escape payment for them, unless the seller can prove that he is not guilty of the charge of being a party to any agreement as to prices, combination, association or trust. We understand that eminent lawyers have advised clients who are members of combinations not to sell goods in Illinois. The only way out of the difficulty is said to be to form a corporation which purchases the goods from manufacturers and sells them to dealers and consumers in the States of Illinois and Missouri, the latter State having also rushed into similar legislation. In other words, the effect of the Illinois law will be to force those manufacturers or sellers who try to protect their prices to draw the lines closer.

CORRESPONDENCE.

Curved Arms in Pulleys.

To the Editor: In an article on "Curved Arms in Pulleys" recently published in *The Iron Age* occurs the following sentence: "Considered as an overhung beam the curvature adds to the length, and therefore reduces the transverse strength in proportion to the increase in length." The article in general is well written, and is full of good mechanics, but I question the accuracy of the passage quoted above. T. H.

Work of the Naval and Military Boards.

The several naval and military boards are now conducting exhaustive experiments with guns, projectiles, armor and powder. In small arms for the army a board is testing the weapons turned out by the French, English, German, Spanish, Italian, Russian and Danish makers, with a view of adopting the best weapon for our troops, in place of the antiquated Springfield rifle. It is also experimenting with the various kinds of smokeless powder, and the conclusions it reaches will be of rare interest. So far it appears to have attained the best results with the French Lebel magazine rifle and the Austrian Wetterln powder, but it has not nearly finished its work.

The Lebel rifle was found to have the greatest initial velocity at the muzzle and the lowest trajectory, and the Wetterln powder to be extraordinarily powerful, without fouling the weapon. Of still larger value are the tests which are being conducted of armor and ordnance on the naval proving grounds at Annapolis, for they are bound to bear with much importance upon the construction of the new navy. One series of trials recently made demonstrated that all steel plates containing only one-fourth of 1 per cent. of carbon were better calculated to resist projectiles than those having a larger percentage of carbon.

An experiment on a larger scale is that which relates to determining the material for the protective deck of the armored cruiser New York, now being built by the Cramps. Targets representing the protective deck were used, one of which was 2½ inches thick, being made of steel, and the other, 3 inches thick, of nickel steel. Four shots were fired at each target from a 6-inch breech-loading rifle, and the higher resistance of the nickel steel was

again clearly proven, making all allowance for its greater thickness. Consequently, ten 3-inch protective deck nickel-steel plates were ordered for the New York, and if they satisfactorily endure further tests they will be adopted for that ship and for cruisers Nos. 12 and 13, which are also under construction on the Delaware.

The shape of projectiles is also receiving the attention of the Naval Ordnance Bureau. While the ogival heads are used in the principal armaments of the world, it has been suggested that, as so large a proportion of these shot and shell are broken in tests against plates, some other form might well be substituted for the head, and a number of different designs will soon be ready for experimenting with. These new styles of projectiles will be tested in both the rapid-fire guns of the secondary batteries and the heavy ordnance of the main batteries, and they may count as another essential factor in the contest of guns *vs.* armor.

Basic Open-Hearth Steel.

Wilhelm Schmidhammer of Resicza has contributed to *Stahl und Eisen* the results of his experience in the manufacture of basic open-hearth steel, some points of

The proportion fluctuates between 25 and 75 to 30 and 70. Knowledge concerning the source of the pig made it readily possible to judge of its character. It was a very different matter with the scrap, as soon the scrap produced at the works proper did not suffice and it must be purchased in the open market.

The result was that many efforts were directed toward the solution of the problem how to produce a more strongly oxidizing action, so that a larger proportion of pig could be used. Complete success was not attained, since the furnaces suffered too much through the corroding action of the oxidizing slag, so that the methods adopted were utilized only in moderate degree.

The introduction of the basic lining at once created a change in these conditions. Aside from the chance of using lower grade material, the character of the process admitted of the addition of a larger percentage of pig. On an average the proportion could be raised to 50 and 50. Iron oxides for accelerating the oxidation could be used in larger quantity, because the lining was not seriously affected thereby. The process proper and the stoppages for repairs were shortened, and the purchase of scrap became a less delicate matter.

of the ore does not sensibly affect it. But if the ore charges are heavy a beginning with them must be made at an early stage, and then the absorption of heat becomes noticeable. The charge which appears to melt down hot becomes dead during the boiling. Particles more thoroughly reduced attach themselves to the bottom, because the bath does not possess the heat to keep them liquid. It takes some time before these accretions of soft iron dissolve again, and then the bath becomes hotter. The heats last one to two hours longer than those carried through under identical conditions without ore.

The assumption was justified with the older method of melting a heavy scrap and light pig charge, that the heat for the bath must be supplied by the flame. In the new method, with the larger charge of pig, the heat producing elements in it, like the silicon in the iron, enter into the question.

Account must be taken of an apparent anomaly. When pig low in silicon is used a quiet melt may be expected, which may cause delay. If the silicon contents are high a larger lime charge is necessary, which delays the heat, but, on the other hand, the development of heat in the bath itself is such that the reactions proceed more rapidly. In a hot furnace, therefore, iron low in silicon, and in

Analysis of Progress of Basic Open-Hearth Heat.

	No. of sam- ple.	Time of sampling after charging.	Metal.					Cinders							
			Silic- con.	Phos- phorus.	Man- ganese.	Carbon.	Iron.	Silica.	Phos. acid.	Alum- ina.	Pro- tox. iron.	Pro- tox. mang.	Lime.	Mag- nesia.	
															H.	M.
Pig charged	...	...	0.945	0.070	1.710	3.430	96.845								
Quantity of constituents, kgs.			28.35	2.09	51.90	162.90	2815.0								
Steel scrap charged			0.037	0.007	0.115	0.327	99.424								
Quantity of constituents, kgs.			1.48	3.88	4.60	13.08	39.77								
Total quantity constituents.			29.83	5.97	56.50	115.98	67.92								
Average analysis charge.			0.423	0.085	0.867	1.056	97.026								
Analysis after melting.	I	3	0.038	0.056	0.511	1.130		27.90	1.06	0.84	11.98	9.95	42.50	4.73	
Addition, 120 kg. hammer scale.	II	3 15	0.028	0.028	0.309	1.009		16.40	2.73	1.10	18.67	14.01	39.00	5.82	
Addition, 180 kg. hammer scale.	III	3 40	0.023	0.017	0.216	0.935		19.60	2.77	0.72	19.23	19.74	35.00	4.80	
Addition, 72 kg. hammer scale.	IV	4	0.016	0.013	0.216	0.614		18.56	2.74	1.21	21.97	12.68	36.00	5.60	
Addition, 48 kg. hammer scale.	V	4 15	0.016	0.013	0.220	0.429		16 16	2.24	0.76	28.37	11.59	36.50	6.14	
No further additions.	VI	4 34	0.014	0.014	0.220	0.272		14.76	2.77	0.82	30.77	10.99	36.00	4.70	
	VII	4 50	0.019	0.011	0.203	0.286		14.20	2.81	2.84	26.81	9.76	36.40	6.48	
	VIII	5 5	0.023	0.013	0.223	0.245		14.64	2.69	2.91	25.05	10 14	36 50	6 78	
	IX	5 25	0.023	0.011	0.194	0.218		13.90	2.30	2.80	24.62	10.41	39.50	5.76	

which may prove of value to American metallurgists. The first experiments with basic lining for open-hearth furnaces were made at Domorava and Alexandrowsk, and the results obtained encouraged work in other localities. Current practice in basic open-hearth work met with less difficulties than are encountered in acid work, as soon as skill in preparing and maintaining the lining was developed. The high quality of the product, even when using lower grade material proved an additional incentive. The advantages of basic work may be best appreciated after a discussion of the difficulties which metallurgists encountered in the older method.

Since no reduction in the phosphorus contents was possible in acid work, the raw material must be selected with the greatest care. Only those works could produce steel really high in quality who had command of correspondingly pure raw materials. But scarcity in the latter developed so far as the class of raw material was concerned of which the larger proportion must be used. Generally the acid process is conducted as a mixing process, in which the total carbon contents of pig and scrap added does not much exceed the carbon contents of the steel aimed at. The acid cinder must not contain a large quantity of iron oxides, since otherwise it would too rapidly destroy the lining. Hence it does not possess a strongly oxidizing action upon the bath of metal. For this reason the charge must consist of a small quantity of pig and a large quantity of scrap low in carbon.

But in consequence of the high quality of the basic steel, the demand rose to such a point that, in spite of the decrease in the charge, scarcity in scrap developed, so that steps were taken to resume the use of ore in the process. The basic lining, it is true, admits of the extensive use of ore, and there is no technical difficulty in making good steel by the pig and ore process, but there are drawbacks, and it is a matter dependent upon local conditions whether the process will admit of low cost of production.

Schmidhammer states that a large number of analyses made by him has proven that even with a low-phosphorus contents in the charge 20 per cent. of silica in the slag is the maximum allowable, in order to bring down the phosphorus in the product to 0.03 per cent. It is necessary on this account, even with low phosphorus in the charge, to add a considerable quantity of lime, and this quantity must be largely increased according to the silica contents of the ore added. The consequence is a large quantity of slag, inconvenient in itself and interfering, too, with the action of the flame upon the bath, so that the melting of the charge is rendered more difficult and more time is consumed. With high cost of producer coal the cost of the steel is sensibly affected by the longer duration of the charges.

The addition of ore, too, in larger quantity delays the process. Light ore additions accelerate the charge when the bath of metal possesses so high a temperature that the heat consumed for the reduction

a cold one material high in silicon, must be used.

The following may be offered as an explanation of the fact that it is possible to use a higher percentage of pig iron when working in the basic process even when additions high in oxide of iron are avoided. If the relation of silicon to an excess of silica in the cinder is the same as it has proven to be in the case of phosphorus in the basic process—namely, that after going beyond a certain silica contents in the slag the excess beyond that percentage is more readily returned to the metallic bath than that portion of silica which is saturated with bases—then it is clear that an excess of bases is necessary in order to render a rapid desiliconizing of the bath possible. Why should not the carbon contents of the pig iron have a reducing action upon uncombined silica in the slag? It may even be assumed that the acid lining of the bottom is exposed to this reducing action in a manner analogous to the entrance of silicon into crucible steel from the clay of the crucible. For this reason it is evident that the final product of basic work is so much lower in silicon than that produced on the acid bottom. This low-silicon contents of basic steel is of the highest importance in explaining its exceptional quality.

The reason why the successive combustion of silicon, carbon and manganese is not so sharply drawn in basic open hearth as it is in Bessemer work may be attributed to the slower progress of the process and to the fact that even during melting

some parts of the charge have undergone all the steps in oxidation, so that when the melting is complete all of the elements in the iron have undergone at least a partial oxidation. In order to fully present this matter, Schmidhammer made a series of analyses, the results of which are tabulated in the Table on preceding page.

The whole charge was put into the furnace at one time and required three hours for melting. After this time the first cinder was drawn off, and after taking every sample a charge of hammer scale mixed with lime and made up into bricks was added until the carbon contents had been brought down to 0.30. Then the bath was allowed to boil quietly. The table shows that the silicon in the charge was largely oxidized during the melting, so that it was reduced by 91 per cent. In a less degree this was true of phosphorus, manganese and carbon, the first being reduced by 34 per cent., the second by 37 and the third by 32 per cent. By way of contrast with Bessemer work, the phosphorus declines with the silicon and reaches the minimum together with it, while manganese follows later and carbon declines steadily to the end of the heat. It will be observed, too, that in order to eliminate phosphorus thoroughly the cinder must be very basic in spite of its low percentage of phosphoric acid. Sample 4 showed that the elimination was complete and that the charge would have been finished, but for a high carbon contents.

The analysis of the cinder accompanying Sample No. 1, shows a composition which does not agree with the figures reached by calculation, which would be silica, 17 per cent.; phosphoric acid, 0.05 per cent.; alumina, 94 per cent.; protoxide of iron, 4.20 per cent.; protoxide of manganese, 5.90 per cent.; lime, 68.30 per cent.; magnesia, 2.50 per cent. The reason for this discrepancy is that a part of the lime had not been dissolved. During the melting of the metal parts of the bottom consisting of dolomite and some cinder from the preceding charge are dissolved. Then the silica contents of the cinder is increased by the sand attached to the pig iron.

Efforts have been made to begin charging only a part of the lime, to remove the acid cinder after the melting, and then to add the balance of the lime. It is true that in this manner the minimum amount of lime is used to obtain a cinder highly basic, but the bottom suffers so much, particularly along the slag level, that its destruction is imminent, so that it is wiser to begin with high additions of lime.

The Baker Iron Company have been organized at Jasper, Tenn., with a capital stock of \$600,000. The new concern will manufacture wagon and field hardware, car forgings, chains, bolts, agricultural irons, mining supplies, special and merchant bar iron and steel. The company own about 2100 acres of land immediately adjoining the town of Jasper, and it is proposed to organize a land company to handle these lands, the stock of which will be given to the holders of the stock in the Baker Iron Company. This plan will give the Baker Iron Company the benefit of the profits coming out of the sale of lands. The new concern will also own about 1000 acres of fine coal and iron lands. This coal land, while having two heavy seams of coal lying at about 700 or 800 feet above the valley, has also a seam of iron ore over 7 feet thick lying about 100 feet below the lower coal seam. No analysis of this ore has yet been made, but should it prove satisfactory it will be very beneficial in developing the iron interests of that section of Tennessee.

MANUFACTURING.

Iron and Steel.

The Wisconsin (charcoal) Furnace, at Fond du Lac, Wis., is again in blast, after having been thoroughly repaired and relined. The owners are highly gratified by the excellent manner in which the new blast has started off. In less than a week after the furnace was put in operation the fuel consumption was reduced to 84 bushels of charcoal per ton of pig iron made. With the price of iron where it now is every furnaceman finds himself confronted with the stern necessity of reducing cost to the minimum, and fuel consumption is being very carefully watched, because it is such an important element to a charcoal furnace.

The chain makers' strike at the Findlay Rolling Mill, Findlay, Ohio, has been settled, the men accepting the company's terms.

No. 2 Carrie Furnace, Pittsburgh, has blown out for relining.

The Jasper Iron Company have been organized at Jasper, Tenn., by J. H. Baker of Allegheny, Pa. The capital stock is \$600,000, of which \$197,000 is paid in. The company propose to erect a plant at Jasper.

The Walton Iron Company have been incorporated at Covington, Ky., by J. F. Walton, Jr., S. Neave and others, with a capital of \$75,000.

The sheet mill of the Reading Iron Works, Reading, Pa., has shut down to make repairs. An addition 80 x 100 feet will be added.

The elevator shaft of the Tonawanda Iron and Steel Works, Tonawanda, N. Y., has been blown down by high winds.

The Milton Iron Company have recently added to their plant at Milton, Pa., in the rolling mill department, a new 10-inch guidetrain, made by the Mahoning Foundry and Machine Shops of Danville, Pa., and are placing in connection with it something rather novel in the way of shears, made by Jenkins & Lingle of Bellefonte, Pa., so that they now have one of the most complete 10-inch trains in the country. They are now busily engaged in completing some large contracts, and have been well occupied during the season.

The citizens of Birmingham, Ala., have subscribed \$102,000 towards a \$1,000,000 steel plant.

It is stated that R. D. Smith & Co. of Birmingham, Ala., have leased the iron furnace of the Birmingham Furnace and Mfg. Company, at Trussville, Ala.

The Essex Iron Company of New York have been incorporated, with a capital of \$30,000.

The Kellogg Seamless Tube and Mfg. Company of Findlay, Ohio, are making projectile material for the American Projectile Company of Lynn, Mass. The shells are rolled from a hollow ingot, making a weldless tube of 4 inches outside diameter, with walls 11-16 inch thick, weighing about 25 pounds to the foot. They are then cut to length by the American Projectile Company. The firm are supplying a carload a week, but expect to increase their output in the near future.

The new puddling plant of the Boston Iron and Steel Company at McKeesport, Pa., was put in operation during the present week. There are 30 puddling furnaces in operation, several of which are double furnaces. Only muck bar will be manufactured, which will be rolled into skelp iron by the National Tube Works Company of that place, which concern own and operate the Boston Iron and Steel Company. It is stated that the firm have decided to build a new bar mill and finishing department.

Grace Furnace of the Brier Hill Iron and Coal Company at Youngstown, Ohio, is now turning out about 300 tons of No. 1 Bessemer iron per day, and expects to materially increase that capacity in the near future.

A disastrous fire occurred early Monday morning in the galvanizing department of the Britton Iron and Steel Company's mills at Cleveland. Much valuable machinery was destroyed, the total loss being estimated at from \$15,000 to \$20,000.

Machinery.

The George B. Smith Foundry Company, Boston, Mass., will erect a new brick foundry 184 x 86 feet.

The I. P. Morris Company of Philadelphia are erecting two one-story erecting shops 55 x 70 and 41 x 47 feet respectively. Other improvements are also being carried out.

The Merwin-McKaig Steel and Iron Shafting Company of Cumberland, Ohio, are arranging to move to Youngstown, Ohio. The move is made to save freight charges, as all the steel the company use is now brought from Youngstown.

One-half interest in the machine shop and foundry of White & Co. of Delhi, N. Y., has been purchased by George A. Sturges of that place. A new firm has been organized under the name of Sturges & White.

At Binghamton, N. Y., a project is on foot to establish a large brass and iron foundry. A syndicate has been formed, and probably a site will be selected and a new building begun within a few weeks. It is expected that not less than 500 men will be employed. The enterprise will be a very important addition to the city.

Cruikshank, Moyer & Co., of the Enterprise Foundry and Machine Works, who make a specialty of steam engines, and manufacture rolling mill, blast furnace and saw mill castings and machinery, are now working on a contract for equipments for the Third Avenue Cable Street Car Railroad at New York City, which will carry them into the fall to complete.

The boiler shop of Richard Dobbin at Lowell, Mass., has been burned at a loss of \$20,000.

An iron foundry is to be built at Walnut Grove, N. C.

An addition of 300 feet will be built to the machine shop of the ordnance department of the Bethlehem Iron Works, at Bethlehem, Pa.

The Somerset Co-operative Foundry at Somerset, Mass., has been sold at public auction to Peter Corr of Taunton, for \$9300. It is reported that the business will be continued.

The Newark Machine Tool Works of East Newark, N. J., have received their fifth order for a large slotting machine for the Washington Navy Yard.

J. Batman of Sunbury, Pa., has shipped a Keystone radial drill press to Cuba.

The 300 molders employed in the stove foundries of the Thomas White Stove Company, and the Comstock-Castle Company, at Quincy, Ill., went out on a strike on the 12th inst. The men have been working under an agreement whereby they have received half pay for castings spoiled by defects in the iron, but last week they decided to abrogate the agreement and demand full pay. The foundries refused to concede, hence the strike.

The Capitol Mfg. Company of Chicago are defendants in a suit for damages brought by one of their workmen, who alleges personal injuries for which he seeks to hold the company responsible. He was working at an emery wheel which burst and claims to have been permanently injured.

The Williams Indicator and Gauge Alarm Company of Pittsburgh, of which A. Fulton's Sons & Co. are sole agents, have just put in four additional sets of their column alarm indicators in the McKeesport works of the W. Dewees Wood Company. This makes 14 sets of these appliances which this firm have supplied to W. Dewees Wood Company.

The Metropolitan Street Railway Company of Macon, Ga., have recently ordered from the Ball Engine Company of Erie, Pa., a complete plant, consisting of a 150 horse-power tandem compound engine, boiler, heater, pump, &c. They expect to have a very complete plant. Dravo & Black, the Pittsburgh representatives of the Ball Engine Company of Erie, Pa., have sold the Braddock Street Railway Company of Braddock, Pa., a 100 horse-power Ball engine, also boiler, heater, pump, &c. They have also sold the Pittsburgh Plate Glass Company two 150 horse-power Ball engines.

The Ferracute Machine Company of Bridgeport N. J., manufacturers of presses and other machinery for sheet and bar metals, have recently increased their plant by building a new erecting shop and adding several new machines. They have just put in two large planers, two drill presses, milling machinery, &c. They are just getting out new patterns for several sizes of cutting presses, also double-action and drawing presses for deep work. They are also building some very heavy punching and shearing machinery for bridge and girder work and are shipping four of these to the Pennsylvania Steel Company. They have a number of features in these heavy presses which are especially desirable in connection with elevated railroad work.

Hardware.

The Lozier & Yost Bicycle Company have been organized at Shelby, Ohio, with a capital stock of \$10,000.

John A. Miller, St. Louis, Mo., manufacturer of Miller's reducing ratchet wrench and Miller's patent vehicle wrench, has just returned from an extended trip through Canada and the North. Mr. Miller succeeded in taking a number of large orders for his wrenches and informs us they are giving satisfaction wherever used. The jobbing houses in Chicago, Detroit, &c., have ordered large quantities, and a local hardware concern has sold 350 dozen of the vehicle wrenches during the past two months. In the last three months Mr. Miller has disposed of something over 12,000 of these wrenches and is compelled to run full time to keep up with the demand.

Miscellaneous.

The Specular Iron Mining Company of Syracuse, N. Y., have filed a certificate of full payment of their capital stock, \$240,000.

The Tyler Tube Works, Washington, Pa., are running on double turn and employing 310 men.

The South Pittsburg Pipe Works, South Pittsburg, Tenn., have filed an amendment to their charter to increase the capital stock from \$1,000,000 to \$2,000,000.

The Mt. Vernon Car Mfg. Company of Mt. Vernon, Ill., are turning out a large number of refrigerator cars for the Union Refrigerator Transit Company of St. Louis. They have also recently taken an order for 300 coal cars for the Cincinnati, Hamilton and Dayton Railroad and 300 box cars for the Illinois Central Railroad, and some box, stock and coal cars for the Chicago, Ft. Madison and Des Moines Railroad.

Philadelphia parties are contemplating the establishment of aluminum works near Bryant, Ark.

It is announced that the old Schuyler copper mines, at Arlington, N. J., are to be reopened and worked. A company has been formed to erect buildings and machinery at a cost of \$55,000. The land has been acquired and operations will begin at once.

Tin plate may be made at Middlesborough, Ky., by the Colorado Tin Plate Company, who, it is stated, are arranging to locate a branch works at that place.

Selecting and Testing Emery Wheels.

Every maker of emery wheels—and their name is legion—claims to have the best in the market; and as every consumer of this class of goods is naturally desirous of buying the best, it becomes a problem somewhat difficult of solution, if his only information as to comparative merit is to be derived from the statements of the competing parties. What user of emery wheels is not familiar with the emery-wheel salesman? And what guide is there to enable him to make an intelligent selection? He is using a certain make of wheel, and, so far as he can judge, finds it satisfactory. A salesman calls and shows his samples, claiming superiority to all other makes on certain alleged improvements in material or process of manufacture. If he cannot secure an order outright he offers to put in a wheel on trial, and generally in competition with any other make or makes which may be in use in the establishment. And, as the only way to decide the question is apparently the one offered, the salesman usually secures his trial order.

But as there are many qualities in a wheel which must be considered in the selection of a particular make in such an expensive class of goods, this test becomes a matter of considerable time and careful watching, in order to obtain facts and avoid being misled by seemingly good or bad results, which may be, in reality, entirely fallacious. It is absolutely essential to use the different wheels under exactly the same conditions if accurate information is desired, and this, in the ordinary method of testing, by using the wheels independently on every-day work, is an impossibility. Many an excellent wheel has been discarded in favor of one greatly its inferior by reason of this difficulty, and the user goes on his way rejoicing in the belief that he has made a judicious selec-

tion, frequently never finding out to the contrary.

In consideration of the importance of the subject, a few suggestions as to the essential qualities of a good wheel and the method of testing and selecting a suitable make may not come amiss to those who have not the necessary information to guide them.

In order to suit the different classes of work, wheels are made of many different grades, as regards kind and quality of the abrasive material, bond, structural condition, &c. Each maker has his own arbitrary system of classification and designation, which conveys no information to the purchaser which would enable him to judge of their quality or adaptability. Some manufacturers make great claims to superiority from the alleged use of pure corundum instead of emery as the material for their wheels. And many consumers, misled by these statements, are firm believers in the superiority of the former. It is a self-evident fact that the essential quality is always adaptability to the requirements of the case. As corundum is one of the forms of sapphire, and next in scale of hardness to the diamond, it is argued that it must be the better material, but that does not follow, necessarily, any more than it would in a steel cutting tool. A chipping chisel made full hardness would hardly prove serviceable for the purpose, although for a lathe hand tool it must be made as hard as possible.

For some kinds of grinding corundum is unquestionably the better material, while for others the preference should be given to emery. And it is frequently found that a judicious mixture of the two will give the best results. The grade of material—i. e., its physical condition of comparative coarseness, designated by numbers, which are recognized commercially as a standard—must be that best suited to the character of the work. In its structural condition the wheel should be as porous and open, proportionately to the grade of the material, as will enable it to retain the necessary cohesion, but if carried to excess this feature not only renders the wheel friable and therefore wasteful, but increases the liability to fracture from centrifugal force. The nature of the material forming the bond is one of the most important considerations to the manufacturer and user of wheels, and to the latter, probably, the one feature to guide him in making his selection of such as are worth his while to test. There are many radically different substances used, such as india rubber, shellac, silicate of soda, and even adhesives which are readily soluble in cold water. There is another class of wheels in which the bond is made by incorporating with the plastic mass a certain percentage of some form of ground silicate which possesses the requisite degree of toughness. After drying, the whole is exposed to a sufficiently high temperature in the furnace to effect the thorough fusion and absorption of the silicate, thus securing a strong bond and open structure, and the power of resisting all ordinary solvents. Also, the bond itself has an abrasive action on the work, and unlike some of those previously named, is not liable to gum or glaze from the heating of the work by the friction of grinding. This wheel is termed "vitrified," and is made by many of the leading manufacturers.

Many attempts have been made to guard against the dangerous liability of wheels to bursting from the centrifugal force due to the high periphery speed essential to the attainment of the best results. Various mechanical contrivances have been tried, and some are still in use, for this purpose; but it is safe to assert that the best security lies in the character of the bond giving sufficient tenacity to the mass of the wheel to enable it to safely resist the strains due to its speed and the rough

usage it may receive at the hands of careless workmen. As the proper speed is always plainly marked on the label of each wheel, it is but very rarely that an accident happens except from careless usage.

In ordering wheels for the purpose of comparative tests it is always best to leave the selection of grade and quality to the manufacturer, giving him as exact information as possible in regard to character of the work, whether brass, steel, wrought or cast iron, and whether hard or soft, also the size and weight of the piece and the maximum and minimum surfaces in contact with the wheel. Of course the quality of surface required must be stated. The experience of the manufacturer will enable him to judge pretty accurately as to which grade of his wheels will give most satisfactory results; but it may occasionally happen that he will prefer not to risk the result on the performance of one grade and may deliver two or more for the test.

As before mentioned, the usual method of testing wheels by subjection to ordinary every-day use is barren of results, so far as accurate comparisons are concerned. What is desired from such trials is to ascertain which make of wheel is the most efficient and economical. There may be many devices of an elaborate and expensive nature which would give accurate information, but these are so rarely available that some more simple method is needed. The following is suggested as being capable of the closest results, and at the same time inexpensive, and requiring no special skill in arranging and making the test. An average-sized wheel should be selected—say 18 inches diameter by 2½ inches face. Any of the ordinary makes of grinding machines may be used. Weigh the wheel accurately, and after securing it on the mandrel or spindle, set the rest as closely to the wheel as will allow necessary clearance, the top or bearing surface being ¼ inch below the center of wheel. Two ¼-inch pins should be driven tightly into holes drilled in the rest on a line with each edge of the wheel face; or, if preferred as a matter of additional security, the holes may be tapped and cap screws used in place of the pins, being made to pass through a plate or clamp of about ½ x 2 inch iron, 3¼ inches long. The screws must be long enough to leave a space of ¼ inch between the clamp and face of rest. Back of the rest, about 12 inches distant, rig a pair of 2 x 4 inch wooden uprights, fastened firmly to cleats nailed to the floor, and having diagonal bracing front and back. The uprights should be 4 inches apart and held securely in that position by being nailed to a block placed between them about 1 inch below top of rest. A pair of wooden sheaves 4 inches diameter by ½-inch face, and grooved for ½-inch rope, should be placed to run on a ½-inch bolt passing through the uprights and carrying a piece of ½-inch gas pipe to serve as a friction roller. The top of this roller should be ½ inch above face of rest. The sheaves should have a common ½-inch plate washer on each side, and have no more end play than is necessary to enable them to revolve freely. A piece of ordinary merchant bar iron ½ x 2½ inches by 37 inches long is to be used for the test piece. Drill a ½ inch hole, edgewise, about ½ inch from the end, and weigh the bar. Place the solid end under the clamp on the rest, and pass a piece of ½-inch cotton rope through hole in the outer end. Lead the ends of the rope over top of sheaves and fasten equal weights on each sufficient to give a little more than the ordinary hand pressure of the work against the face of the wheel. The weights should be placed high enough above the floor to allow of a fall of 25 inches.

The machine may then be started and time noted. Observe the action of the wheel closely to see that the amount of weight is correct, and that it is cutting at

its best; also note the effect as to heating on the test piece. Allow the grinding to continue uninterruptedly until 24 inches of the bar have been removed, and note the time. Weigh the test piece and wheel and subtract from their original weights to ascertain the amount of each which has been consumed during the test. These quantities, together with the time of test, are what are required for the comparison.

The other wheels to be tried should be subjected to the same manipulations, using test pieces of same character and from the same bar, the only change being in varying the amount of weight to give pressure which will enable the wheel to work to best advantage. It is best to complete the record by noting these weights for comparison. After all the wheels have been tested it becomes simply a matter of comparing the cutting properties of the wheel from the weight of iron consumed and the time required for its accomplishment. The relative durability of the wheels is shown by comparing the weights consumed in proportion to weight of iron. Should the results be so close as to warrant any uncertainty in deciding, the operation can be repeated until the wheels have been worn down to half, or less, of their original weights, and if the results are still close, there will be very little choice between the wheels. It will be well to observe during the running whether the wheels show signs of glazing to any serious extent, as this is an important point. It will be seen that this method is capable of any modifications necessary to ascertain the adaptability of the wheels to particular kinds of work or material, although the results of above tests will indicate the relative efficiency and durability for any and all purposes.

One of the principal aims of the manufacturer is the attainment of close uniformity not only in all parts of the same wheel, but one wheel with another of the same grade. In all standard makes this may be regarded as sufficiently reliable to warrant the selection of the make showing the best results from the test. Of course the question of price is an important element in the selection, as a superiority of say 5 per cent. in durability, if at an additional cost of 5 per cent., shows no net gain, and, if there is a greater difference in price, the less durable wheel will be the cheaper. The care of wheels in use is a point well worthy of the attention of foremen, as the life of even the best makes depends to a great extent on the care which they receive. As soon as it shows the least sign of running out of true, the wheel should be turned off, using either a diamond tool or the ordinary wheel dresser. The least disturbance of accurate balance at the high rotative speed causes rapid increase of the trouble, and not only affects the wheel, but flats the journals of the mandrel.

Michael Helmbacher, one of the pioneers of the iron manufacturing business in St. Louis, died at his residence, 3301 South Thirteenth street, at 9 o'clock a.m. Monday, 10th inst., of an affection of the liver, aged about 71 years. Mr. Helmbacher came to St. Louis from Germany when a young man, about half a century ago. He became identified with the iron business, and founded the Helmbacher Forge and Rolling Mills, of which he was president for 35 years. He was president of the Lafayette Savings Bank for a number of years, and was also identified with other large business enterprises.

The White Star liner Teutonic, from Liverpool, broke the ocean record by crossing in 5 days 16 hours and 31 minutes. This is 1 hour and 37 minutes better than the record recently made by her sister ship Majestic.

TRADE REPORT.

Chicago.

(By Telegraph.)

Office of The Iron Age, 50 Dearborn street, CHICAGO, August 19, 1891.

Pig Iron.—The most important feature in the trade of last week was the better demand for Lake Superior Charcoal. Several 1000-ton lots were taken by consumers who bought in May and now need additional supplies. Other sales are in sight. It must be said that demand is by no means general, but in view of the recent stagnation in the Charcoal trade it is encouraging to report some business. Better prices were realized than might have been expected under the circumstances. Local Coke was in fair request, and a few lots were sold of 500 to 1000 tons. Business in Southern Iron was confined to small orders. The Coke Iron market here appears to be in somewhat better shape than in Ohio and in other sections of the central West. Prices are firm, as manufacturers have their output well sold up. Quotations unchanged, as follows, f.o.b. Chicago:

Lake Superior Charcoal.....	\$17.00 @	\$17.50
Local Coke Foundry, No. 1.....	15.50 @	15.50
Local Coke Foundry, No. 2.....	15.00 @	15.25
Local Coke Foundry, No. 3.....	14.50 @	15.00
Local Scotch.....	15.50 @	15.50
Ohio Strong Softeners.....	17.75 @	18.25
Southern Coke, No. 1.....	15.75 @	16.25
Southern Coke, No. 2.....	15.00 @	15.25
Southern Coke, No. 3.....	14.50 @	15.00
Southern, No. 1, Soft.....	15.00 @	15.75
Southern, No. 2, Soft.....	14.25 @	14.75
Southern Gray Forge.....	14.00 @	14.00
Southern Mottled.....	13.50 @	14.00
Tennessee Charcoal, No. 1.....	18.00 @	18.00
Alabama Car Wheel.....	21.50 @	22.50
Coke Bessemer.....	17.00 @	17.00
Hocking Valley, No. 1.....	17.00 @	18.50

Bar Iron.—Better business is the general report from sellers, who feel considerably encouraged over the improved outlook. Car orders are coming up again, and although not in large blocks, yet in such a way as to evince a better condition of affairs in that trade. An interesting incident of the week's business is an inquiry for Mexican consumption. Prices range from 1.65¢ to 1.70¢, half extras, Chicago, but manufacturers are looking for an advance soon if the mills continue to fill up as well as they did last week.

Other Manufactured Iron.—There is nothing special to report in Plates, Sheets, Galvanized Iron or Structural Material, except that the demand for mill lots is still spasmodic, being alternately dull and active.

Track Supplies.—The volume of business in Steel Rails is not so large as it was, but this is not regarded by sellers as evidence of a serious falling off. More transactions are pending, and the outlook is still favorable for good business through the fall months. Quotations continue at \$31.50 @ \$32, according to the character of order. Fastenings are unchanged.

Old Rails and Wheels.—About 2000 tons of Old Iron Rails have changed hands lately at \$23 @ \$23.25. Old Steel Rails are quiet at \$14 @ \$16, according to length. Old Car Wheels are stagnant at \$15.50.

Scrap.—The market for Scrap is dull. Even high-grade material is in limited request, as the local consumption has been cut down by the stoppage of the National Forge dealers. However, last week's prices may be quoted as follows, per ton of 2000 pounds: No. 1 Railroad, \$19.50 @ \$20; No. 1 Forge, \$19; No. 1 Mill, \$15; Fish Plates, \$21.50; Axles, \$24; Pipes and Flues, \$13; Horseshoes, \$18.50 @ \$19; Cast Borings, \$8; Wrought Turnings, \$11.50; Axle Turnings, \$14; Machinery Cast, \$13; Stove Plates, \$10; Mixed Steel, \$12; Coil Steel, \$14.50; Leaf, \$16; Tires, \$16.50.

Metals.—Copper is inclined to ease off a little, but local sellers are still quoting carloads of Lake at 12½¢ and casting brands 12¢ @ 12½¢. Prime Western Spelter is being placed at 4.90¢ @ 4.95¢ for monthly deliveries of one to three carloads. Pig Lead is less active, the sales of the week aggregating about 400 tons, at about 4.35¢. The demand is now light, but the market is still firm.

Philadelphia.

Office of The Iron Age, 230 South Fourth St., PHILADELPHIA, Pa., August 18, 1891.

There is little or no change to note in the price of any description of Iron, yet the feeling is distinctly better, although on close analysis it is not easy to say in what respect it is better. There is more business, although much of that has not been taken at full market prices, but it is business, and business that was not within reach until the past few days. The improvement, therefore, probably consists in the fact that there is a market for material if price be made low enough, even though quality may not be in all respects just what buyers would like to secure. This feature was dwelt upon at some length in our last report, and as it is still one of the characteristics of the market we allude to it again, remarking at the same time that no permanent improvement would be possible until there has been a general cleaning up of odd lots, and, in fact, of everything that has been waiting for a market. This preliminary has been in progress for several days, and while it may not be fully completed, enough has been done to place the market in a position to respond to any favorable developments which may be made in the near future.

Pig Iron.—The preceding paragraph applies mainly to Pig Iron, although it also includes pretty much everything on the list. A very fair amount of business has been done during the week, including all grades from the lowest to the highest. Prices have not changed in the least, the better qualities being high enough in proportion to the others, so that makers have not deemed it expedient to ask an advance, although they are pretty well sold up and inclined to look for better prices later on. Medium qualities, new brands, &c., have been placed at about the figures quoted herewith, varying according to quantity, quality, point of delivery, terms of payment, &c. The outside figures are usually obtained for tidewater deliveries, and from 25¢ to 50¢ less for locations such as Harrisburg, York, Wilmington, Baltimore or points at which Alabama, Virginia or Central Pennsylvania Irons have advantage in the matter of freights.

Ohio Softeners, No. 1x.....	\$19.00 @	19.00
Ohio Softeners, No. 2x.....	18.00 @	18.00
Standard Penna, No. 1x.....	17.75 @	18.00
Standard Penna, No. 2x.....	16.25 @	16.75
Medium Penna, No. 1x.....	17.25 @	17.50
Medium Penna, No. 2x.....	16.00 @	16.25
Virginia, No. 1x.....	16.75 @	17.25
Virginia, No. 2x.....	15.75 @	16.00
Standard Neutral All-Ore Forge.....	14.50 @	15.00
Ordinary Forge Cinder mixed.....	13.75 @	14.00
Hot-Blast Charcoal.....	20.00 @	22.00
Cold-Blast Charcoal.....	24.00 @	27.00

Muck Bars.—There is very little to report in the way of actual business, as buyers and sellers are a good deal apart in their views. Asking prices at mill vary from \$26.25 to \$27, while bids are in most cases not over \$26.50 @ \$27, delivered, and at the latter figure a first-class article is required, and not in very large quantities, either.

Steel Billets.—The market is unsettled as regards bids and offers, but there is probably little or no change in actual values. There is a good deal of inquiry, with bids varying from \$26.75 to \$27.50, delivered, beginning at about Harrisburg for the former quotation, and so on to tidewater. It is believed that orders have been

taken at these figures or their equivalent, as those quoting 25¢ more failed to secure business which was placed somewhere, presumably at less money.

Steel Rails.—There is nothing new to report under this heading. Prices are maintained at \$30, f.o.b. cars at mills, but the amount of business forthcoming is not important.

Bar Iron.—The market cannot be called very buoyant, although there is some increase in the demand, but so many are competing for it that prices are barely steady, while in some cases positive weakness has been developed. There is some talk of orders from car builders and other large concerns, but there is very little of that kind of business offered around here. Prices vary from 1.70¢ to 1.80¢ for city deliveries and 1.65¢ @ 1.70¢ at interior points, and hardly enough business to go around at these figures.

Plates.—There is nothing specially buoyant to report, although in medium sized lots there is a pretty good demand. Mills are in most cases quite full for this and next months' deliveries, although what one cannot take, others can. At the same time a better feeling is noticeable, although as yet it has not shown itself in the matter of prices, which are still almost the lowest of the entire year. Ordinary asking rates (delivered) are as follows, although concessions have been obtained on desirable lots, especially on Steel:

	Iron.	Steel.
Tank Plates....	1.90 @ 2.00¢	2.00 @ 2.10¢
Refined.....	2.20 @ 2.30¢	2.10 @ 2.20¢
Shell.....	2.30 @ 2.40¢	2.40 @ 2.50¢
Flange.....	3.20 @ 3.30¢	2.50 @ 2.75¢
Fire-Box.....	4.00 @ 4.25¢	3.00 @ 3.50¢

Structural Material.—The mills are fairly well employed, but new business is not coming out in large blocks, although there are a good many small orders around. Some delay in getting out work last month was caused by labor troubles and the general indisposition to work during the holiday season, but mills are now catching up with back orders, and are, therefore, somewhat anxious in regard to the near future, although with the present outlook there is not much danger of any protracted scarcity of business. Meanwhile prices are about as quoted for some time past, viz.: Angles, 2.05¢ @ 2.10¢; Sheared Plates, 2¢ @ 2.10¢, and 10¢ @ 15¢ more for Steel, according to requirements. Tees, 2.5¢ @ 2.6¢; Beams and Channels, 3.1¢ for either Iron or Steel. Since writing the above we find that bids are asked for on 2000 cars, which, if taken in this vicinity, will be very helpful to the Bar mills. We are also advised of a sale of ordinary Steel Plates at a fraction less than 1.95¢, delivered, which shows great anxiety for business as well as extreme irregularity in prices.

Sheet Iron.—Market without special change of feature. The volume of business is somewhat disappointing, although the demand may start in, as it frequently does, when least expected. Prices unchanged, and for best makes quotations are as follows:

Best Refined, Nos. 14 to 20.....	3.00¢ @ 3.10¢
Best Refined, Nos. 21 to 24.....	3.10¢ @ 3.20¢
Best Refined, Nos. 25 to 26.....	3.20¢ @ 3.30¢
Best Refined, No. 27.....	3.40¢ @ 3.50¢
Best Refined, No. 28.....	3.50¢ @ 3.60¢
Common, ¼¢ less than the above.	
Best Soft Steel, Nos. 14 to 20.....	3¢ @ 3½¢
Best Soft Steel, Nos. 21 to 24.....	3½¢ @ 4¢
Best Soft Steel, Nos. 25 to 26.....	4¢ @ 4½¢
Best Soft Steel, Nos. 27 to 28.....	4½¢ @ 5¢
Best Bloom Sheets, ¼¢ extra over the above prices.	
Best Bloom, Galvanized, discount....	@ 67½¢
Common, discount.....	@ 70¢

Old Material.—Market somewhat irregular, but on the whole prices remain about the same as last week. Nevertheless, sales cannot be forced unless at

sharp concessions, but as stocks are not large or burdensome, holders have been able to secure prices about as follows varying according to quality, quantity, point of delivery: Iron Rails, \$21.50 @ \$22.50; Steel Rails, \$17.50 @ \$18.50; No. 1 Railroad Scrap, \$20.50 @ \$21.50, Philadelphia, or for deliveries at mills in the interior \$20.50 @ \$21.50, according to distance and quality; \$15 @ \$16 for No. 2 Light; \$14 @ \$15 for best Machinery Scrap; \$13 @ \$14 for ordinary; \$15 @ \$16 for Wrought Turnings; \$10 @ \$10.50 for Cast Borings, and nominally \$24 @ \$25 for Old Fish Plates, and \$16 @ \$17, delivered, for Old Car Wheels.

Wrought-Iron Pipe.—There is little or no change to report under this heading. The demand for small sizes is quite active with good prospects for the near future, but prices are still weak and irregular, notwithstanding the nominal advances recently announced, in which discounts are quoted as follows:

Butt-Welded Black.....	52½¢
Butt-Welded Galvanized.....	42½¢
Lap-Welded Black.....	62½¢
Lap-Welded Galvanized.....	50¢
Boiler Tubes, 2½ inch and under.....	52½¢
Boiler Tubes, 3 to 6 inch.....	60¢
Boiler Tubes, 7 inch and larger.....	55¢

Pittsburgh.

Office of The Iron Age, Hamilton Building,
PITTSBURGH, August 18, 1891.

Pig Iron.—Trade continues dull, and while the offerings are not excessive they are fully equal to the demand. While production is large, both here and in the valley districts, there does not appear to be any great accumulation, and with an increased demand furnacemen are hopeful of being able to realize better prices. At present, however, business is dull and buyers still have the advantage, and as a rule are refusing to buy beyond their immediate wants. We quote prices as follows:

Neutral Gray Forge.....	\$13.75 @ \$14.00, cash.
All-ore Mill Iron.....	14.50 @ 15.00, "
White and Mottled.....	13.00 @ 13.50, "
No. 1 Foundry.....	16.25 @ 16.50, "
No. 2 Foundry.....	15.25 @ 15.50, "
No. 3 Foundry.....	14.50 @ 14.75, "
No. 2 Charcoal Foundry.....	21.00 @ 21.50, "
Cold-Blast Charcoal.....	25.00 @ 27.00, "
Bessemer Iron.....	15.75 @ 16.00, "

About the only important sale reported during the week was 10,000 tons Bessemer Iron at Wheeling, at \$15.80, cash, there. It is well to bear in mind that while nearly all the sales of Forge Iron made by our city furnaces for some time past have been at \$14, that means delivered to mills in this immediate vicinity, and the cost of transportation, which is paid by the furnacemen, ranges from 20¢ to 30¢ per ton, so that in reality the furnaceman does not net more than \$13.70 @ \$13.75 for his Iron.

Muck Bar.—Continues dull and prices are weaker, owing to increased offerings and a light demand; we now quote at \$26.50 @ \$26.75, cash. One of the largest buyers here has been off the market for some time past, owing to labor complications, but has again started up, the effect of which will be to improve the demand.

Manufactured Iron.—There is increasing demand for nearly all kinds of Merchant Iron, and the mills generally are pretty well employed, although the volume of business is not as large as it was at this time last year. The railroads are the largest buyers at the present time; they did not commence buying until it was late, as they were determined to make sure of the outcome of the crops. In addition to the railroads bridge builders are busy, and the demand for Pipe Iron has been on the increase for some time past, although it is not up to what it was a year ago. Prices remain unchanged:

Bar, 1.70¢ @ 1.75¢; Plate and Tank, 2.10¢ @ 2.15¢; No. 24 Sheet, 2.75¢ @ 2.80¢, all 60 days, 2 % off for cash. Skelp Iron, 1.65¢ for Grooved, and 1.90¢ for Sheared, four months, 2 % off for cash.

Nails.—The Cut-Nail trade remains much the same as reported a week ago; in addition to being dull, manufacturers say that at the prices obtaining it is difficult to get a new dollar for an old one. We continue to quote 35 average at \$1.55 @ \$1.60, f.o.b. at factory, 60 days, 2 % off for cash. The Wire-Nail trade is also dull and prices are weak. We continue to quote for immediate or near-by delivery at \$1.90 for 60 average, 60 days, 2 % off for cash, but it is understood on pretty reliable authority that sales have been made for delivery next month at \$1.85.

Structural Material.—There is an increasing demand for everything in this line, and the mills making a specialty of Structural Iron have about all they can do; some of them are pressed. Beams are particularly active, as contractors are now anxious to get their work on as rapidly as possible before the bad weather sets in. Prices remain about as last quoted: Beams and Channels, 3.10¢; Sheared Bridge Plates, 2.15¢ @ 2.20¢; Angles, 2¢; Tees, 2.60¢; Universal Mill Plates, Iron, 2.05¢; Refined Bars, 1.80¢ @ 1.85¢.

Steel Plates.—Continue very dull; very little new business, and about all the mills have to do is to work up old orders. Prices remain as last quoted, although for a desirable order the prices would be shaded. Fire Box, 3.90¢ @ 4.25¢; Tank, 2.10¢; Shell, 2.35¢; Flange, 2.55¢. There have been no Government contracts recently, and shipbuilding for the lakes has been dull for some time past, but promises to improve later on in the season.

Merchant Steel.—There is a moderate business at unchanged prices. Crucible Tool Steel, 6½¢ @ 7¢; do. Spring, 4¢; do. Machinery, 4½¢ @ 5¢; Bessemer Spring Steel, \$2.50; do. Machinery, 2.40¢ @ 2.50¢; Toe Calk, 2.50¢; Tire Steel, 2.20¢; Steel Bars, 1.80¢ @ 1.85¢ rates, full extras.

Barb Wire.—The regular syndicate price in this district is as follows: Painted \$2.75 in car lots and \$2.80 for less than a carload; Galvanized, \$3.25 for car lots and \$3.30 for less than a carload. It is expected that under the new order of affairs business will be conducted more satisfactorily, so far at least as related to the manufacturers.

Billets and Slabs.—There is a fair business, but prices are weak. Most of the business in Billets is at \$25.25 @ \$25.50, cash, at makers' mill, but it is probable that a desirable order could be placed at \$25. Some of the mills are pretty well sold up, while others are soliciting business, and it is the latter who are cutting prices. With most Western points, Wheeling can now compete with Pittsburgh, as freight rates are about the same.

Manganese.—Sales of domestic 80 % Ferromanganese at \$66.50, cash, which has been the price for a year or more, very little foreign being sold in this district.

Wrought-Iron Pipe.—There is a fair business, although it does not compare favorably with that of a year ago, when the mills were all busy. Prices remain unchanged: Discounts on Black Butt Pipe, 52½ %; on Galvanized do., 42½ %; on Black Lap, 62½ %; do. Galvanized, 50 %; Boiler Tubes, up to 2½-inch inclusive, 55 %; 3 to 6 inch inclusive, 60 %; 7-inch and larger, 55 %; Casing, all sizes, 55 %.

Old Rails.—There is some inquiry for Old Iron Rails, with but few offering; may be quoted steady at \$23 @ \$23.50. Old steel Rails quiet and do not appear to be

as stiff as they were a few weeks ago. The supply of Iron Rails is small, and growing less and less, as none have been made for a number of years.

Railway Track Supplies.—While prices remain unchanged there is a good demand. Spikes, 2.15¢, on cars at makers' works, 30 days; Splice Bars, 1.75¢ @ 1.85¢; Track Bolts, 2.75¢ with Square and 2.85¢ with Hexagon Nuts.

Wire Rods.—Continue dull, and in the absence of sales may be quoted at \$36 @ \$36.50; the last sale reported was at \$36, at makers' mill.

Steel Rails.—There is no change in price, \$30, cash, at mill, with only a fair demand.

Old Material.—There is a moderate demand with little or no recent change in prices. Sales No. 1 Railroad Wrought Scrap at \$19 @ \$19.50, net ton; Steel Bloom and Rail Ends at \$17.50, gross ton.

Coke.—There is a continued demand, but prices remain unchanged. Furnace Coke, \$1.90; Foundry Coke, \$2.30; Crushed, \$2.65, all per net ton, f.o.b. cars at ovens.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date August 17, say: While there is absolutely no observable change in the general condition of the Iron trade from the extreme dullness which has now existed so long, it is hoped and naturally believed that the larger number of inquiries which have been seen during the past week will result in some good-sized transactions for Pig metal. These inquiries are confined mostly to Lake Superior Charcoal Iron for car-wheel purposes, indicating certainly an improvement in their business. There is some talk of a car famine, and considering the large crops that must be transported, the report is obviously a true one. The general foundry trade keep ordering in small lots and report their business as favorable. If the railroads order equipment, as they are expected to do by September 1, a better market and higher range of prices would certainly be seen for the first time this year. At present quotations must be repeated, as follows:

Lake Superior Charcoal, all numbers.....	\$18.00 @ \$18.50
Lake Superior Coke, Bessemer.....	17.75 @ 18.25
Ohio Blackband (40 per cent.).....	18.00 @ 18.50
Lake Superior Coke Foundry, all ore.....	17.50 @ 18.00
Southern No. 1.....	16.25 @ 16.50
Southern Gray Forge.....	14.00 @ 14.50
Jackson County (Ohio) Silvery.....	18.00 @ 18.50

Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fourth and Main Sts., CINCINNATI, August 19, 1891.

Pig Iron.—There has been a light volume of business during the past week, with no essential change in the general tone of the market. There has been less urgency to sell round lots, perhaps, because it has been demonstrated that material concessions would be necessary to place large quantities, but there has been a large volume of current trade in a small way—a few hundred tons and smaller quantities—which in the aggregate makes a respectable tonnage. Doubtless heavy consumers have covered their necessities for some months ahead, but there is a growing undertone of confidence on the part of producers that the worst is over, for a material improvement in general business seems to be assured; in fact, it is already cropping out in various places, and the Iron trade will eventually feel the improvement. There are efforts being successfully made to hasten deliveries on previous contracts with expectancy of a

scarcity of cars later in the season. There are rumors of an increased consumption of Iron by pipe works, repair shops and car and locomotive works, but this market cannot by experience confirm them. As showing the general tendency, it may be mentioned that bids for Gray Forge at a little less than \$9.75 at the furnace have been rejected. There is no essential change to be made in quotations:

Foundry.	
Southern Coke, No. 1.....	\$14.75 @ \$15.00
Southern Coke, No. 2.....	13.50 @ 13.75
Southern Coke, No. 3.....	13.00 @ 13.25
Ohio Soft Stone Coal, No. 1.....	16.50 @ 17.00
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.50
Mahoning and Shenango Valley.....	17.00 @ 17.50
Hanging Rock Charcoal, No. 1.....	20.00 @ 21.00
Hanging Rock Charcoal, No. 2.....	19.00 @ 20.00
Tennessee and Alabama Charcoal, No. 1.....	16.00 @ 17.00
Tennessee and Alabama Charcoal, No. 2.....	15.00 @ 16.00

Forge.	
Gray Forge.....	12.50 @ 12.75
Mottled Neutral Coke.....	12.00 @ 12.25

Car Wheel and Malleable Irons.	
Standard Southern Car Wheel.....	19.25 @ 19.75
Hanging Rock, Cold Blast.....	23.00 @ 26.00
Lake Superior Car Wheel and Malleable.....	18.00 @ 18.50

Cleveland.

CLEVELAND, August 17, 1891.

Iron Ore.—The same conditions noted last week. Fluctuating freight rates are keeping the transactions in Ore confined to a few scattering sales of desirable grades for which furnacemen are willing to pay the higher prices asked. Ore is held at an advance of from 35¢ to 50¢ per ton over the May and June quotations, when between 5,750,000 and 6,250,000 tons were sold. It is doubtful if the sales for the past two weeks exceed 25,000 or 30,000 tons. The freight rate from Escanaba dropped to 90¢ @ 95¢ last week and several charters were made at these figures, but the \$1 rate was quickly re-established and again prevails, with \$1.15 per ton asked for bringing down Ore from Marquette and \$1.20 per ton demanded for Ashland and Two Harbors charters. During the past seven days 45,000 tons of Ore have been forwarded from the local docks to the furnaces, against 27,000 tons for the corresponding period last year. The receipts of new Ore for the same period aggregated 72,000 tons, as compared with 85,000 tons in 1890. Buyers seem encouraged by the decline in lake freights last week to believe that rates may still go considerably lower, thus permitting them to complete their stocks without paying the advance which, although entirely warranted by the rates asked for forwarding Ore from the mines, is certainly not in harmony with the condition of affairs in the Pig Iron market. Eastern furnacemen are asking for non-Bessemer and with the beginning of the new week a few sales for delivery east of the Alleghenies are reported. Otherwise the market is very quiet.

Pig Iron.—The market is exceedingly quiet, although the furnaces are busily engaged upon the Iron sold for September and October delivery. There is a disposition on the part of furnacemen to restrict production to the orders already on the books. There is something of a demand for Lake Superior Charcoal Iron. Furnacemen are naturally interested in the increase in Ore freights, and are giving almost as much attention to this phase of the situation as to the Pig Iron market itself. Strictly local quotations are as follows:

No. 1 to 6 Lake Superior Charcoal.....	\$18.50 @ \$19.00
No. 1, 2 and 3 Bessemer, per ton.....	16.00 @ 16.25
No. 1 Strong Foundry, per ton.....	16.25 @ 16.75
No. 2 Strong Foundry, per ton.....	15.25 @ 15.75
No. 1 American Scotch, per ton.....	16.80 @ 17.00
No. 2 American Scotch, per ton.....	15.80 @ 16.85
No. 1 Soft Silvery, per ton.....	16.50 @ 17.50
Mahoning and Shenango Valley Neutral Mill Irons, per ton.....	14.00 @ 14.50
Mahoning and Shenango Valley Red Short Mills, per ton.....	14.00 @ 14.50

Nails.—No changes in prices or in the condition of the market are reported, and lower quotations are not looked for before the middle of September, if even then. The market is quite firm at \$2.10 for Wire and \$1.70 for Cut Nails in stock.

Old Rails.—Old Americans are now quoted at \$22.50 @ \$23, with a fair demand.

Bar Iron.—The market is steady at last week's quotations, 1.65¢ @ 1.70¢ for Common Bar. The mills are well supplied with orders.

Scrap.—The market continues active and prices are quite firm at last week's quotations: \$19 @ \$19.25 for No. 1 Railroad Wrought; \$13.50 for Cast Scrap; \$13.25 @ \$13.50 for No. 1 Wrought Turnings, and \$16 @ \$16.50 for Old Car Wheels.

St. Louis.

OFFICE OF The Iron Age, 214 N. Sixth st., St. Louis, August 17, 1891.

Pig Iron.—The past week has shown considerable improvement. Several large sales, averaging from 500 to 3000 tons, have been consummated, and the total sales for the week are far in excess of any one week for the past three months. This increased business is traceable to the extremely low prices at which Iron has been offered in this market during the past month. Furnaces have been persistent, and with the persistence was coupled prices that were lower than at any time during the year, hence the sales. Smaller foundries are beginning to look around with a view of replenishing their stocks, and it is quite likely a fair trade will be transacted from this time on. Prices have not materially improved, but with sales made in this market last week furnaces are not so anxious to sell and prices are steady. Southern Charcoal Irons are in good demand, and at the prices prevailing to-day are considered cheap. The outlook is encouraging, and as general business is beginning to pick up, the future of the Iron trade is considerably brighter. We quote as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry.....	\$15.50 @ \$15.75
Southern Coke, No. 2 Foundry.....	14.50 @ 14.75
Southern Coke, No. 3 Foundry.....	13.75 @ 14.00
Gray Forge.....	13.00 @ 13.25
Southern Charcoal, No. 1 Foundry.....	17.00 @ 17.50
Southern Charcoal, No. 2 Foundry.....	16.50 @ 16.75
Missouri Charcoal, No. 1 Foundry.....	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry.....	15.00 @ 15.50
Ohio Softeners.....	17.50 @ 18.75

Bar Iron.—Mills report a steady trade, which, however, is for small lots for prompt shipment. There is nothing being offered in the way of large contracts, and mills are becoming anxious regarding the future. Railroad work has simmered down to almost nothing, and the jobbing trade are only moderately busy. Prices continue without change, as follows: Lots from mill are quoted at 1.70¢ @ 1.75¢, delivered on cars at East St. Louis. Lots from store command 1.82½¢ @ 1.87½¢, according to quantity.

Barb Wire.—Trade continues fairly active and mills are fully employed. The Columbia Patent Company are experiencing no difficulty in securing enough orders to keep them busy. Jobbers report an increasing trade in this commodity, and there is less talk of low prices than for some time past. We quote as follows: Painted, in carload lots, 2.85¢; Galvanized, 3.35¢; less than car lots 5¢ additional. Terms, 30 days, or 2% discount for cash within ten days from date of invoice.

Wire Nails.—This department has relapsed into absolute quietness. Sales are light, and prices nominally the same. Car-load orders are booked on the basis of \$2.15, small lots from store at \$2.25.

(By Telegraph.)

The Pig Lead market has eased off somewhat, the labor troubles at the Omaha Smelting Works have been settled and most of the men have returned to work. This early settlement of the strike was unexpected, and the market showed some uneasiness when the news was received. Offerings are plentiful on the basis of 4.25¢. In Spelter there is no change to note. The market is dull and prices are nominally 4.75¢ for early shipments. Stocks are light and any early revival of trade would doubtless bring higher prices.

Louisville.

LOUISVILLE, KY., August 17, 1891.

Pig Iron.—There is nothing new to report in the situation; the market continues very quiet, and the buying is largely confined to small lots ranging from a car or two to 100 tons, for immediate shipment, and there seems to be no disposition to buy for more than a month or two ahead. While standard Car-Wheel Irons are yet to be had on a very low basis, there is a stiffening tendency, and it is believed that the extremely low prices at which some round lots changed hands some time ago will not be available again, as producers of these are beginning to feel that it is more to their interest to hold on to their iron and await the revival of car building than to continue to sacrifice it by forcing it on the market. Coke Irons remain about the same as for some time past, although some sales are reported at less than current quotations. We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry...	\$14.50 @ \$15.00
Southern Coke, No. 2 Foundry...	13.75 @ 14.25
Southern Coke, No. 3 Foundry...	13.25 @ 13.75
Southern Coke, Gray Forge...	12.75 @ 13.25
Southern Charcoal, No. 1 Foundry	16.00 @ 17.00
Southern Car Wheel, St'nd br'nds	19.00 @ 20.00

New York.

Office of The Iron Age, 96-102 Reade street, (New York, August 19, 1891.)

American Pig.—The New York market has shown very few changes, the only item of interest being unconfirmed rumors of the selling of Southern Gray Forge on the basis of \$9.50. Northern brands are quoted at \$16.75 @ \$18 for No. 1; \$16 @ \$16.50 for No. 2, and \$14 @ \$14.50 for Gray Forge. Southern Irons sell at \$16 @ \$17 for No. 1; \$15.25 @ \$16 for No. 2; \$15.50 @ \$16 for No. 1 Soft, and \$14 @ \$14.50 for Gray Forge.

Spiegeleisen and Ferromanganese.—The market has remained exceedingly dull. There are reports that one of the leading Rail mills has asked that deliveries of foreign Spiegeleisen be postponed on account of the closing down of the works. We continue to quote, nominally: Spiegeleisen, \$27.50 to \$28, and Ferromanganese, \$63.50 to \$64.

Billets and Rods.—In domestic Billets the market is dull, while in Foreign Billets there has only been one inquiry of consequence. Importers name \$31.50 @ \$31.75 for foreign stock. Domestic Open-Hearth Billets are held at \$37 @ \$38, while domestic Wire Rods in the East are quoted at \$37.75 @ \$38 at tidewater. We note the sale of a few thousand tons of foreign Wire Rods for shipment to the Pacific Coast at prices lower than those which could be made by home producers, chiefly on account of the low freights from

European to Pacific Coast ports. Conferences are reported to be going on between American Wire Rod manufacturers, a gathering of this kind having taken place at a leading seaside resort. From the West come reports of a large business in domestic Rods, the details of which, however, are not yet available.

Steel Rails.—Eastern mills do not report a single transaction of consequence, and there is little business in the market. The Eastern mills are rapidly exhausting their orders, and it seems probable that some of them will be forced to close down entirely at an early date. In fact, one of the mills has already notified those with whom it has contracts for Ore, Pig and Spiegel that deliveries must be stopped for the present. The price remains unchanged at \$30.75 @ \$31, at tidewater.

Rail Fastenings.—Aside from a contract for Fish Plates with a Canadian road very little business is reported. Quotations for Spikes remain at 2.15¢ @ 2.25¢, delivered, the price fixed by the association; Bolts and Nuts, 2.70¢ @ 2.80¢, and Fish Plates, 1.70¢ @ 1.80¢.

Manufactured Iron and Steel.—The mills tributary to this market report that while they are still working busily on old orders the amount of work for architectural purposes which is now coming up is small. Plates have shown a tendency toward weakness, the only large contract now on the market being a lot of 1200 tons of Tank Plates for a gas tank. We continue to quote: Angles, 1.95¢ @ 2.10¢; Sheared Plates, 1.95¢ @ 2.25¢; Tees, 2.45¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 1.95¢ @ 2.15¢ for Tank; 2.3¢ @ 2.6¢ for Shell, and 2.5¢ @ 2.7¢ for Flange, on dock. Bars are 1.7¢ @ 1.9¢, on dock.

Financial.

Secretary Foster, after a protracted conference with Senator Sherman in Ohio, made a statement indicating that the Treasury is in a comfortable condition, and that no anxiety exists with reference to the extension of the 4½ % bonds, or other matters. Although there is less money in the Treasury than for many years past, no embarrassment is likely to occur. He adds the significant statement: "We are on a gold basis, and there is no occasion for alarm as to the ability of the Government to maintain this condition. The Secretary has ample power to maintain and increase the present reserve of gold. I do not see any occasion for the exercise of this power, but I do not hesitate to say, should the occasion arise, I shall not fail to use it." A statement prepared at the Treasury Department shows that the amount of money in circulation January 1, 1891, was nearly \$1,529,000,000, with \$24.10 as the *per capita* allowance, the highest in the history of the United States.

In commercial circles the week has been more cheerful, the buoyancy manifested on the Produce Exchange affecting other departments of trade. The extraordinary outlook for the distribution in Europe of all descriptions of American breadstuffs has a buoyant influence. A week ago Saturday wheat in this market was 99¢ ¾ bushel. On Saturday prices bounded, and again on Monday, when September wheat was quoted \$1.18½, an advance equal to 75¢ a barrel for flour, but actual sales of flour were not higher than 20¢ advance. The effect was a break in the flour market, Western millers rejecting all orders. Sales of wheat in a single day made the enormous aggregate of 21,500,000 bushels. The excitement was heightened by a cable stating that instead of rye, wheat would be adopted for the German army. There was also intelligence of a more serious deficiency in France. Corn

was under a corresponding pressure, with larger purchasing orders. The inference is that with lessened imports and exports increasing at a rapid rate gold may soon be expected to arrive from Europe. The harvest is now in progress all over the Northwest, with the best results. The minimum yield in Minnesota and the Dakotas is put down at 150,000,000 bushels, other grains turning out proportionately well. Lack of storage facilities is the chief embarrassment.

Clapp & Co. in their wheat circular say: "Sentiment looking West is very bearish, based on a 600,000,000 crop; looking toward Europe it is strong, based on a 300,000,000 demand. Ocean carrying accommodations are strained to meet the future wants of shippers off grain, who are willing to pay recent strong rates." At the close stocks record substantial gains.

Exports of merchandise from New York for the week, \$5,979,000; imports, \$9,947,000.

The stock market was irregular and generally higher, with the grangers, Atchison, Topeka and Santa Fé, the Northern Pacific and the coal shares strongest, and Louisville and Nashville and Union Pacific about the weakest. The feature was free selling of the last-named property on a report that the efforts for the relief of the company's embarrassments were ineffectual, but later the directors made an arrangement which, it was understood, would result in extending the floating debt in some fixed form. Louisville and Nashville was affected by disquieting rumors accompanied by free selling said to be for European account. On Saturday morning there was a buoyant movement, which was renewed on Monday, mainly based on cheering crop reports. At times there was good buying of railroad mortgages, with the largest dealings in the Atchison, Topeka and Santa Fé issues. Western operators were influenced by active and higher markets for all breadstuffs in Europe, and the fact that the harvest of spring wheat is now general. Shortage of cars is again a frequent complaint, but the roads will soon add largely to their rolling stock. The official statement of the Chicago and Northwestern Railway Company for the fiscal year shows an increase in the gross earnings of \$628,837, but the net shows a decrease of \$390,402.

United States bonds are firm and 4½s are advanced ½. Quotations as follows:

U. S. 4½s, 1891, registered.....	100½
U. S. 4½s, 1891, coupon.....	100½
U. S. 4s, 1907, registered.....	116¾
U. S. 4s, 1907, coupon.....	116¾
U. S. currency 6s, 1896.....	110

The foreign exchange market was dull and lower. The posted rates for sterling were reduced to \$4 84½ for 60-day bills and \$4.80½ for demand.

The statement of the Associated Banks was favorable. There was a decrease of \$803,625 in reserve, which now stands at \$17,617,225 surplus. The loans show a gain of \$2,950,400; the specie is down \$507,500; the deposits other than United States are up \$1,549,300. The Treasury transfers of \$2,436,000 were very largely to the West, while the express shipments were mostly to the Middle States. The Western demand is expected soon to be in larger volume. Time loans were in fair request, but the offerings did not increase and rates were 5 % for 60 days and 6 % for from three to six months on good Stock Exchange collateral. Toward the close of the week there was some disposition on the part of city institutions to buy choice paper on the basis of 6 %. Quotations remain unchanged. Respecting the Western situation a Chicago paper says: "Within the next fortnight the active season of fall trade will begin and grain movements will increase the requirements of borrowers in

the country. In spite of the early harvests throughout the West and Northwest, the absorption of funds has not been particularly great of late, and the balances of outside banks here are not yet falling off to any material extent." In Boston there is difficulty in placing even the best grades of outside paper. Boston banks report that they have all the business they can attend to in looking after the needs of their depositors. The wool trade is still taking considerable money.

Bar silver closed in London at 45½d. per ounce. The commercial price of bar silver in New York was .90½ per ounce.

Dry goods jobbers report some improvement in the last few days, and an active fall trade is confidently looked for. Many Southern buyers are in the market and some from the West. Cotton is again weak, port receipts being exceptionally heavy. In cotton seed oil there is more business and at better prices. Refined sugar is reduced ½¢ on low grades. A Brazilian syndicate to corner crude rubber and which holds 90 % of the visible supply is said to have had only indifferent success.

The clearings of 60 cities for the week ending August 15, 1891, show a decrease of 16.1 %. Outside of New York the decrease was 5 %. New York decreased 23 %, Boston 10.9, Philadelphia 16.9, San Francisco 7.5, Kansas City 21, Omaha 28.8, Denver 14.9, Seattle 36.6 and Tacoma 8.8. Chicago increased 4.4 %, St. Paul 8.2 and Galveston 289.7.

Lake shipments eastward from Chicago last week were 121,000 tons, against 46,000 by rail.

Coal Market.

The Anthracite Coal operators, through their agents, during the week announced an advance in circular prices, to take effect September 1. By this action they ignore the present stagnant condition of the market by what is popularly understood as "a bluff." They hope to excite a new demand before the expiration of the present month, or failing in that to brace the market in anticipation of a demand that cannot be far away. The new prices add 20¢ to Stove, both Lehigh and Free Burning, and 15¢ to Chestnut. Coal sold between now and September 1 will be at present circular prices, deliveries to extend to September 15. That is to say, unfilled orders at the date mentioned will be canceled. The practical effect of this movement is to lift up the market to the July circular, making the prices for September, f.o.b., Egg, \$4; Stove, \$4.20; Chestnut, \$3.90. This giving notice of prices to take effect at a future day, rather than making an immediate advance, is by some in the trade considered a doubtful policy, because giving consumers an opportunity to investigate and to satisfy themselves respecting the true situation. Reviewing the course of the market for the season it appears that at early spring prices, with no circular, considerable Coal was sold. More was sold at the May circular prices, and none higher than June prices. July prices are simply on paper, but are supposed to be climbing.

The official statement of the production of Anthracite for July makes the total 3,791,839 tons, an increase of 481,200 tons over July, 1890. For the year the figures are 21,756,438 tons, an increase of 3,000,000 over the same time in 1890. Stock on hand at tidewater July 31, 703,000 tons, a decrease of 25,490 for the month.

The Car Service Association, to secure the prompt return of cars, have made regulations as follows for New York termini: Cars containing Coal or Coke shipped by or on account of any member of this association, to itself or its regular

sales agent, and standing on its own tracks or on the private tracks of such agent, connected with or operated by its own road, will not be subject to car service until consigned for delivery to a local consignee; this not to apply to Coal sold from such tracks. Cars containing Coal or Coke shipped to tidewater for delivery direct to vessels, or to be stored for shipment by vessels, shall not be included in reports to the manager.

Coal vessels have accepted freights as low as 40¢ to 50¢ per ton to Boston. Increase of accommodation for Coal carrying is quite marked through the cutting down of old, dismantled steamers. In their barge form they are able to carry equal to five to ten schooner loads.

The reports of the discovery of extensive Anthracite Coal fields in Mexico have been confirmed by advices received by the Bureau of American Republics, Washington. Coal has been found in borings 50 miles apart. The diamond drill has gone through three veins, one of 2 feet, another of 4 feet and a third of 7½ feet, and in a fourth it has penetrated 22 feet and is still working in Coal.

James Boyce, the most extensive Coal operator and shipper in Maryland, died at Baltimore, 16th inst. He organized large mining interests in the Anthracite regions of Pennsylvania, and during the war made a large fortune. After the war he established the George's Creek Coal Company and engaged heavily in the shipping business, having his own vessels running in the Soft Coal trade.

Metal Market.

Pig Tin.—Advices by cable show that Straits shipments during the first half of the month were 1475 tons, or within 425 of the entire quantity shipped during July. Since the beginning of the month about 1700 tons have arrived at this port and several hundred are due within the next ten days. Statistically the position would thus appear to be rather weak, but, instead of moving as would appear natural under the circumstances, prices have responded to a rise of about £1 in the London market, while speculation has shown a fair degree of spirit. Current month delivery brought ½¢ per lb advance over the lowest price touched last week, and a similar rise is noted on deliveries further ahead. Apart from the speculative trading there has been no life in the market, consumers and jobbers seeming to be governed in some degree by the statistical position and suspicious of the bold game played by the speculative element. Wednesday's cables came somewhat lower, and prompted sales on 'change of spot at 20.10¢, and September delivery (seller's right to double) at the same price. Jobbing parcels were dealt out at 20½¢ @ 20¾¢, from store.

Copper.—Consumers are placing comparatively few and only small orders for Lake Superior Ingot. This continued inaction on their part strengthens faith in the accuracy of the report that the Calumet and Hecla Company have arranged to supply most of the large consumers for several months ahead at prices agreeable to both sides at time of deliveries. For the present, the other companies offer with assumed reserve, and for ordinary parcels of 25,000 to 50,000 lb any price below 12½¢ @ 12½¢ is looked upon as being strictly exceptional. In casting brands there has been a freer movement at a lower level of cost. Several fair-sized lots went at 11½¢, and one company are represented as having taken orders for about 1,000,000 lb at a shade under the price named. Export movement continues heavy, but the movement thus far does not appear to have

been more than equal to the stock carried over at the beginning of the year, and under heavy production and moderate consumption there must necessarily be a considerable accumulation of Lake product, if not of other varieties, at first hands. On the Metal Exchange there were sales Wednesday of 50,000 lb Lake Ingot, October delivery, at 12¢, seller's right to double.

Pig Lead.—In this metal there has been very little movement during the past week. Larger lots than single carloads figure as the exception in dealings at this point and comparatively few of those changed hands. In one instance 4.42½¢ was accepted, but most transactions have been 4.45¢, which price is bid at this writing. Sellers are asking 4½¢ and offer rather indifferently.

Spelter.—There has been no improvement in the demand and the market remains in a spiritless condition, with prices tending somewhat in buyers' favor. Prime Western in carload lots is offered at 5.05¢ and as low as 5¢ has been named on some brands without exciting interest.

Antimony.—There has been merely the routine movement and prices are still more or less in buyers' favor. Hallett's is quoted at 10½¢, LX at 10½¢ @ 11¢, Portuguese (99 % pure), at 11½¢ and Cookson's at 12½¢ on the spot.

Tin Plate.—There has been no improvement in the demand from any quarter, and apart from ordinary jobbing business there is little doing. Prices are irregular, with full former figures for Cokes adhered to, but some lines of Ternes and Bright Charcoals let go at concessions. Comparatively few Welsh makers have resumed work in full thus far, and advices from the primary market state that active operations will not be undertaken until orders become more liberal. Coke Tins—Penlan grade, IC, 14 x 20, \$5.40; J. B. grade, do., \$5.45 @ \$5.50; Bessemer do., \$5.40 @ \$5.45; Siemens Steel, \$5.50 @ \$5.55; Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.75; Siemens Steel, IC basis, \$5.85 @ \$6; IX basis, \$6.85 @ \$7. IC Charcoals—Melyn grade, \$6.50; for each additional X add \$1.50; Allaway grade, \$5.90; Grange grade, \$6; for each additional X add \$1. Charcoal Ternes—Worcester, 14 x 20, \$5.75; do., 20 x 28, \$11.25; M. F., 14 x 20, \$7.50; do., 20 x 28, \$15.50; Dean, 14 x 20, \$5.25; do., 20 x 28, \$10.50; D. R. D. grade, 14 x 20, \$4.90 @ \$4.95; do., 20 x 28, \$9.90; Mansel, 14 x 20, \$5.12½; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.15; do., 20 x 28, \$10.80; Dyffryn, 14 x 20, scarce; do., 20 x 28, \$10.75. Wasters—S. T. P. grade, 14 x 20, \$4.80; do., 20 x 28, \$9.70; Abercarne grade, 14 x 20, \$4.80; do., 20 x 28, \$9.60.

New York Metal Exchange.

The following sales are reported :

THURSDAY, August 13.

20 tons Tin, August.....19.90¢

FRIDAY, August 14.

10 tons Tin, August.....20.00¢
35 tons Tin, September.....20.00¢
25 tons Tin.....19.95¢
(Seller's right to double to October 1.)
25,000 lb Lake Copper, August.....12.00¢

MONDAY, AUGUST 17.

40 tons Tin, September.....20.10¢
25 tons Tin.....20.00¢
(Seller's right to double to October 1.)

TUESDAY, August 18.

10 tons Tin, spot.....20.10¢
10 tons Tin, September.....20.15¢
15 tons Tin, August.....20.15¢
25 tons Tin, September.....20.25¢
25 tons Tin, October.....20.25¢
25 tons Tin, November.....20.25¢
25 tons Tin, December.....20.25¢
25 tons Tin, August.....20.25¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, August 19, 1891.

In the market for Pig Iron warrants business has been small during the past week and prices have undergone little change. Local deliveries of Scotch Pig are freer, although consumers hold back, in expectation of lower prices, but foreign demand is better and stocks in public stores have been reduced to 501,000 tons. Cleveland warrants touched 40/ under the influence of a reduction in the stock in store to 154,000 tons and rumors of strike by engine men. The latter was averted by the men agreeing to a reduction of 6% in wages and prices receded about 6d. Latest sales of warrants were at 47/3 @ 47/4 for Scotch, 39/6 for Cleveland and 48/5 for Hematite.

Pig Tin transactions have been on a more liberal scale during the last half of the week, and prices have averaged higher, chiefly under the influence of scarcity of prompts. Outside speculative interest, however, continues moderate.

Copper has ruled stronger under the influence of a good demand for cash warrants and moderate offering following somewhat heavy "bear" selling early in the week. The turn has encouraged operations for long account, and freer buying on the part of consumers, together with good statistical position, has also helped to stiffen the market.

The Tin Plate market is firm, with 13/ at Swansea named as strictly inside price for ordinary Cokes. There are no signs of any pressure to make sales on the part of manufacturers.

Old Iron is offered rather more freely by some sellers, and purchases could probably be made at prices slightly lower than those generally quoted.

Scotch Pig Iron.—The market is quiet and prices stand about the same as they were a week ago, but rather in buyers' favor.

No. 1 Coltness, f.o.b. Glasgow	60/
No. 1 Summerlee, " "	58/
No. 1 Gartsherrie, " "	58/
No. 1 Langloan, " "	60/
No. 1 Carnbroe, " "	49/
No. 1 Shotts, " at Leith	60/
No. 1 Glengarnock, " Ardrossan	59/
No. 1 Dalmellington, " "	51/
No. 1 Eglinton, " "	50/

Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 10/.

Cleveland Pig.—There is no improvement in the demand, and makers are offering at 39/9 for No. 3 Middlesborough, f.o.b.

Bessemer Pig.—Demand does not improve and prices are rather weak at 49/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Spiegeleisen.—There is but little doing and prices remain without change. English 20% quoted at 95/, f.o.b. shipping port.

Steel Rails.—Business very slow and prices without change. Heavy sections quoted £4. 5/, and light sections £4. 15/ @ £5. 15/, f.o.b. at N. W. England shipping point.

Steel Blooms.—A small trade passing at former prices. Makers quote £4. 5/ for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—There is no improvement in the demand and prices remain as before. Bessemer, 2½ x 2½ inches, quoted at £4. 7/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—The market very quiet and prices nominal. Bessemer quoted at £4. 7/6, f.o.b. at N. W. England shipping point.

Old Iron Rails.—Inquiries are few and buyers and sellers apart on prices. Tees quoted at £2. 17/6 @ £3 and Double Heads £3 @ £3. 2/6, f.o.b.

Scrap Iron.—Market still very quiet. Heavy Wrought Iron quoted at £2. 10/ @ £2. 12/6, f.o.b.

Crop Ends.—Sales are small and demand is slow. Bessemer quoted at £2. 15/ @ £2. 17/6, f.o.b.

Tin Plate.—There is little doing and prices are without change. We quote, f.o.b. Liverpool:

1C Charcoal, Alloway grade	15/ @ 15/6
1C Bessemer Steel, Coke finish	13/9 @ 14/
1C Siemens	14/ @ 14/3
1C Coke, B. V. grade	13/3 @ 13/6
Charcoal Terne, Dean grade	13/3 @ 13/9

Manufactured Iron.—Only a moderate business passing, and little movement in prices during the week. We quote, f.o.b. Liverpool:

Staff, Marked Bars	£ s. d. @ 8 10 0
" Common "	6 10 0 @ 6 12 6
Staff, Bl'k Sheet, singles	@ 7 2 6
Welsh Bars (f.o.b. Wales)	5 10 0 @ 5 12

Pig Tin.—The market a shade easier at the close, with Straits quoted at £91. 17/6, spot, and £92 for three months' futures.

Copper.—Less doing to day, and prices barely steady. Merchant Bars quoted at £52. 10/, spot, and £53, three months' futures. Best Selected, £57.

Lead.—Demand light and the market rather weak. We quote at £12. 2/6 for Soft Spanish.

Spelter.—Business moderate but prices steady, at £23. 12/6 for ordinary Silesian.

Imports.

Hardware, Machinery, &c.

Baldwin, —, Mach'y, cs., 11
Baur, C. M. Vom. Hardware, cs., 2
Baker, Hermann & Co., Arms, cs., 32
Downing, R. F. & Co., Hardware, cs., 5
Folsom, H. & D., Arms, cs., 23
Hartley & Graham, Arms, cs., 21
Montgomery, J., Mach'y, cs., 37
Montell & Son, Chains, 3
Perry & Ryer, Mach'y, cs., 2
Schoverling, D. & G., Arms, cs., 12
Thebaud Bros., Mach'y, pcs., 2
Union Hardware Company, Lignum Vitæ, tons, 44
Vom Cleff & Co., Chains, cks., 4
Van den Toorn, W. H., Arms, cs., 20; Mach'y, pgs., 11
Waterbury, L. & Co., Mach'y, cse., 1
Werleemann, H., Arms, cs., 40
Wiebusch & Hilger, Arms, cs., 2; Hardware, cs., 7; Chains, cks., 26
Wyman, Chas. H. & Co., Gun Barrels, cs., 5

The Damon Iron Works and several adjoining properties at Cambridge, Mass., were destroyed by fire on Tuesday morning, involving losses aggregating nearly \$300,000, divided as follows: Damon Safe and Iron Company, \$200,000; Edw. Kendall & Co., \$80,000; machinists employed by both firms, for tools, \$10,000; Harvard Dry Plate Company, \$8500.

Material is daily arriving at Kirkland, Wash., for building the blast furnaces and works of the Great Western Iron and Steel Works. The erection of the blast furnace will begin at once. It will be 75 feet high with a 17-foot bosh, and will have a capacity of 1000 tons of pig iron per week. The hot-blast stoves will be 72 feet high and 26 feet in diameter, of the Ford & Moncur pattern. The two blowing engines have steam cylinders 42 inches in diameter, 5-foot stroke, and will

be capable of developing 1500 horsepower. During the construction of the furnace the engines, boilers and machinery of the foundry, machine and pattern shops will be put in place, and these departments put in operation to make a number of heavy castings for the furnaces and stoves.

The Maine's Engines.—The 9000 horse-power engines for the armored cruiser Maine will shortly be in readiness to run at the shops of the builders, the N. F. Palmer, Jr., Company of this city. The engines are practically finished. They have already been assembled and taken down, and are being assembled for the second time. It is the desire of the Secretary of the Navy to see the machinery running before it is actually put aboard ship, and the builders propose to make a gala day out of the occasion. A large platform with raised seats will be built about the engines, and from a commanding position guests will have an opportunity to witness the machinery at work. The Maine's engines are to date the most powerful marine engines ever built in the United States.

In the inference case between Alexander McDougall and Theodore W. Phinney, on an appeal from the examiners in chief, the Commissioner of the Patent Office has awarded priority of invention to Phinney.

The Weimer Machine Works Company of Lebanon, Pa., have received an order from the Sloss Iron and Steel Company, Birmingham, Ala., for a blowing engine 46-inch steam cylinder, 90 inch air cylinder, 72-inch stroke. The weight of engine will be 140 tons, and it will be placed at the North Birmingham furnaces of the above company. They have shipped to the Virginia Iron and Railway Company of Goshen, Va., one of their patent cinder cars, also a full set of charging barrows to the Jefferson Iron Works, at Steubenville, Ohio.

The lower mill of the Lackawanna Iron and Steel Company, at Scranton, Pa., has shut down for an indefinite period. The mill will remain idle until an improvement in the rail trade warrants its resumption.

It is reported that the labor trouble at the Green Ridge Iron Works, Scranton, Pa., has been settled, and that the men will return to work, having renounced the Amalgamated Association.

H. Conklin, who is widely known as an inventor of concentrating machinery, is building a mill to treat the tailings of the Chateaugay mill. It is reported that the chief backers of the enterprise are persons identified with the Lackawanna Iron and Steel Company. We understand that the company will pay 50 cents a ton for the tailings.

The backbone of the strike at the works of the Catasauqua Mfg. Company, at Catasauqua, Pa., has been broken.

P. Barnes, of Jones & Laughlins, Pittsburgh, is soon expected home from Europe.

W. P. Shinn has begun the building of a magnetic concentrating plant at Croton Falls, N. Y. The Ball & Norton machine will be used.

The American Railway Equipment Company of 15 Cortlandt street are putting on the market the Servis brace-head spike.

HARDWARE.

Condition of Trade.

AS THE SEASON advances the amount of business shows a steady increase, and both manufacturers and jobbers are now fairly busy. The condition of the grain market and the certainty of large exports at full prices has produced a buoyant feeling regarding the future in Hardware as well as in all other lines of business. The tightness in money, however, still causes difficulty in collections.

Chicago.

(By Telegraph.)

The Shelf Hardware jobbers have done less trade this year than last up to the present time, but it has been more profitable, as it has run more largely into shelf goods than last year, when a very heavy business was done in staple goods, on which margins are very small. Business is improving steadily now, and the most wide awake houses are making extensive preparations to handle a larger volume of trade than ever, which they confidently expect to develop before many days have passed. The Heavy Hardware jobbers report as strong a demand as last week, and in some respects better. Orders are coming in well from the Southern section as far as South California, but the Northern sections of this territory do not show up so satisfactorily.

St. Louis.

(By Telegraph.)

There is an increased trade in Shelf Hardware noted and a large business is also being transacted in Heavy Hardware. The demand for Builders' Hardware has eased off somewhat, while orders for assorted stocks are coming in from the South earlier than was expected. Copper and Copper Goods continue unsettled and some low prices are reported. Wire Nails are dull and the same can be said of Cut Nails. The demand for Paints shows some improvement, but prices at present prevailing are considered too low to continue for any length of time. The general condition of the territory tributary to this market indicates an unusual heavy fall trade, and local jobbers are getting into shape so as to meet the demand. Collections do not improve to any extent.

Omaha.

LEE-CLARKE ANDRESEN HARDWARE COMPANY.—The past week or so has witnessed some improvements in the wholesale trade of Omaha. So far, country merchants generally have refrained from buying their fall supplies, and have been closely watching the growth of our main staple, the corn crop. For a time the weather was unpropitious, but recent continued clear skies and warm sunshine have served to change the aspect altogether from one of doubt and uncertainty to al-

most an assured fact. The yield promises now to be the largest on record. The cautious method of ordering goods referred to above is gradually disappearing, and orders are coming forward with briskness and vigor, and of a very satisfactory volume. Stocks in the hands of our jobbers are full and complete and ready to meet any seasonable demand that will probably be made.

Boston.

BIGELOW & DOWSE.—Trade continues fully up to the average for August. Some retailers report increased sales, but generally trade is dull. Orders cover a general line of Hardware, and but few are buying except for immediate wants. Everything looks favorable for a good trade this fall. We have no wheat and corn in New England to decide the question for us, but prosperity in the West helps our manufacturers and indirectly helps us all. There have been no changes in the price of Steel Cut or Wire Nails, but the sales are unusually large and the factories full of orders. Barbed Wire is being sold at the prices made by the Columbia Company, who control 85 per cent. of the whole output. It looks as if prices would be better maintained now than heretofore, when the competing mills left no margin for themselves or for the jobbers. Prices of Wire are undoubtedly lower now than they will be later on.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—What change there appears to be during the two weeks just past stands to the credit of a fair increase, not only in the way of mail orders but in returns received from our travelers; but while the orders in numerical figures have been gratifying, it has been noted in some sections that the inclination is against any very heavy anticipation of future wants. As far as the orders of the day on which we are obliged to forward this are concerned, we are pleased to report them heavier than they have been for some time since. Such articles as Parers, &c, which are in demand wherever there is a good fall fruit crop, are having a good sale and the indications point to a scarcity of these goods similar to that experienced on Cherry Seeders, Freezers, Kettles and other lines earlier in the season. Prices as a rule are firm, with weakening in a few spots only; remittances have been only fair, complaints still being received from trade as to inability to make collections from the country. An improvement, however, can be reported during the week just past over the one preceding. If we may be allowed to anticipate, the prospects certainly seem flattering. The prospect for the crops at present seems gratifying, and unless a series of unforeseen accidents occur it will place the farmer in better financial condition than he has been for a number of years back,

and from the farmer to the trade through the usual channels we feel all hands will receive their percentage of benefit.

Baltimore.

CARLIN & FULTON.—We report a decided improvement in business this month when compared with July, but when with this time one year ago we see reduced sales on account of the low price of Cotton and the conservative buying of the Southern trade. In ordinary times this month should be one of the heaviest for sales in the year, but with the price of the great staple below the cost of production the planter is discouraged and the storekeeper uncertain as to the future. In other sections, however, we are glad to report a more satisfactory state of affairs, for large crops and good prices are having their beneficial results in both remittances and orders, and from present indications the approaching fall season will be one of the heaviest ever known outside of the extreme Southern markets.

San Francisco.

HUNTINGTON-HOPKINS COMPANY.—Trade is about as lively as we could expect just at present. Harvest is in full swing, crops good, prices for crops fully go up to expectations, if not a little better, thus creating a general healthy feeling all along the line. We do not look for much increase in trade until after the entire crop is harvested, and from present indications we fully anticipate a lively fall. As the result of good crops and fair prices, collections begin to assume a healthier aspect. We might report that during this last month there has been quite a movement in the building trade, more particularly in the city.

Portland, Ore.

FOSTER & ROBERTSON.—We venture the assertion that nowhere on the globe are the conditions of life more enjoyable than they are in the State of Oregon at the present time. To the surprise of the "oldest inhabitant" this section of our much favored State was visited last week with a three days' rain, which was as delightfully refreshing as it was unexpected. This rain, while it interfered temporarily with the harvest which is now in progress, did no harm to the grain but has done great good to fruits, vegetables and grasses. Then it has been followed with days that are free from excessive heat, permitting the hardest labor in the open field without undue fatigue or danger of sunstroke, while the nights are cool, refreshing and invigorating. Our sympathies go out toward the poor unfortunates of less favored sections, who are forced to labor under a burning sun, in danger of death at any moment, and who find no relief or rest in the sultry nights that follow days of excessive heat. Trade so far this month has been fully up to our expectations, orders from travelers being fair, while mail

orders are excellent. Prices continue steady, with little or no change. There has been a general expectation among the trade that the early fall would witness a moderate advance in prices, but there is little hope that these expectations will be realized. There is too general a weakness in the Eastern market to warrant any advances on this Coast. Collections are more difficult to make just at present than at any previous time this year, and will probably not improve much for the next 30 days, or until grain of which there is an abundance, and for which unusually good prices will be paid, begins to move.

Cleveland.

THE W. BINGHAM COMPANY.—The fall campaign can hardly be said to have opened up, but trade so far in August has been good, with bright prospects for the future. Mail orders have been particularly numerous, and for general assortments, indicating that when travelers get fairly started they will find their customers ready to place good orders. Wire Nails are in good demand, but with no improvement in prices over those last quoted by us. Cut Nails are dull, and little called for. The prices on Barbed Wire adopted by the Columbia Patent Company are in vogue here, with fair orders. We have been experiencing some extremely hot and very dry weather, no rain having fallen for six weeks. The crops, however, were so far advanced as not to be injured thereby.

Louisville.

W. B. BELKNAP & Co.—We are pleased to report a decided improvement in business, both in the matter of orders and collections. Remittances are more prompt, with less requests for extensions and renewals than for two or three months past, and there is a good demand for almost all kinds of stock for immediate consumption. The business which has been cut off has been that of new stocks for boom towns and for hurried construction incident to promotion of land schemes, &c. Quite a number of mills have closed down for repairs and on account of hot weather, and are selling out their remnants of stock, which, however, are badly assorted, and will not cut much figure from now on. The very low price at which staple goods were selling prevented the money squeeze which we have just been through from being anything like a general panic. Had values been inflated in either railroad securities or Iron and Iron products, we should have seen a general smash up instead of the gradual and comparatively harmless liquidation, now almost over, as we believe. Farmers in the interior of the State, if we can judge from reports, are as a rule realizing on their crops, and are fairly well satisfied with the prices secured. Banks seem comfortably supplied with money, due to long-practiced caution of credits. Their lines have been largely curtailed, until they are now within the bounds of safety. Altogether the future is to our vision, full of encouragement—more so than at any writing since last fall.

Notes on Prices.

Cut Nails.—The demand during the week may be reported as slightly better than has been the case of late, but is still small and unsatisfactory, and the fact is becoming more and more apparent that this article from the competition of Wire Nails is steadily losing its place in the market. We continue to quote \$1.60 to \$1.65 for the Wheeling district, and \$1.50 to \$1.55 for the Eastern district, round lots at mill, with the usual 25 or 30 cent average.

Chicago, by Telegraph.—Steel Nails are about as reported last week. The demand is fair and quotations from factory are \$1.70, Chicago, for 30-cent average, with concessions on desirable orders. Jobbers quote \$1.75 to \$1.80 from stock.

Wire Nails.—The market may be characterized as active, with numerous sales both large and small. As indicated before, a disposition is manifested by individual mills to obtain higher prices, but so far as we know these prices are not reflected in actual sales. The production is large, mills generally running at full capacity and very few being shut down from any cause. We quote \$1.90 to \$2 at mill for carload lots and \$2.10 to \$2.20 for small lots from store.

Chicago, by Telegraph.—Wire Nails in good demand, and manufacturers who insist on outside prices are receiving quite a number of orders, although mainly for small quantities. Large orders are going to those who still quote low prices. At the same time there is a feeling that bottom has been touched, and there are not even rumors of soft spots. Manufacturers quote about \$2.05, Chicago, from factory, but this may be regarded as the rate on carloads. Jobbers are asking \$2.15 from stock, but shade this on desirable orders.

Barb Wire.—The demand may be considered good for the season and prices are uniform on the schedule of the Columbia Patent Company. This company are still at work adjusting some minor points affecting the relation of the manufacturers to one another, but as regards the trade their plan seems to be complete and in successful operation.

Chicago, by Telegraph.—Quotations by jobbers are unchanged as yet, being \$2.80 for Painted and \$3.35 for Galvanized. The Columbia Patent Company have changed their California price so that the advance is now \$1.25 instead of 75 cents. The latter rate was an error, as actual freight rate from Pittsburgh to San Francisco is \$1.25.

Planes.—In the reference in our issue, 30 ult., to the revised prices of Wood Planes as adopted by the manufacturers at their recent meeting, we mentioned that they were subject to an additional discount of 2 per cent. for cash. This, however, was erroneous, as the terms are cash net, subject to sight draft in 30 days for unpaid accounts, no discount being allowed for cash in 10 days. That the trade may be accurately advised in regard

to the matter we print below the list as adopted:

	Discount.
Molding and Fancy Planes.....	40&10 %
First Quality Bench Planes.....	50&10 %
Second Quality Bench Planes.....	55&10 %
Apple, Box and Rosewood Planes.....	25&10 %
Plane Irons.....	30&10 %

Loaded Shells.—In consequence of the unprecedented demand for Loaded Shells which has been developed this season, manufacturers are beginning to decline orders for early shipment, and none of them will accept orders except for such quantities as they can ship before Oct. 1.

Shot.—The fact that the advance in Pig Lead during the past fortnight has been followed by large orders for metal by Shot manufacturers has given rise to the feeling that an advance in Shot is likely to occur at an early date.

Terry's Open Links.—Missouri Malleable Iron Company of St. Louis, Mo., quote the following prices on Terry's Open Links manufactured by them:

No. 1, per gross.....	\$6
" 2, ".....	8
" 3, ".....	12
" 4, ".....	16

Elbows.—Blymer Bros. Company, Mansfield, Ohio, issue the following price-list upon their Elbows:

Columbus O. K. Stamped Elbows.

	Refined Iron.	Planished Iron.	Genuine Russia.
5 inch, per dozen	\$3.50	\$6.50	\$7.50
5½ " " "	4.00	7.50	8.75
6 " " "	4.50	8.50	9.50
6½ " " "	5.00	9.50	10.50
7 " " "	5.00	9.50	11.00

Columbus O. K. Five-Piece Elbows.

	Refined Iron.	Planished Iron.	Genuine Russia.
5 inch, per dozen	\$2.50	\$6.00	\$7.00
5½ " " "	2.50	6.00	7.00
6 " " "	2.50	6.00	7.00
6½ " " "	3.50	7.50	8.50
7 " " "	3.50	7.50	8.50

Columbus O. K. Four-Piece Elbows.

	Refined.	Planished.	Russia.
5 inch, per dozen	\$2.00	\$5.50	\$6.50
6 " " "	2.00	5.50	6.50
7 " " "	3.00	7.00	8.00

Cordage.—The condition of the market remains without change as to prices, but the feeling is very strong, and some considerable orders have been placed in the expectation of an advance.

Glass.—Reports are conflicting as regards the stocks of Glass in manufacturers' hands. From one source we learn that stocks are now practically cleaned out, while equally reliable information comes to us that jobbers have no difficulty in obtaining such assortments and quantities of Glass as they desire. The Glass market is undoubtedly in sympathy with the Iron market, and trade during the past three or four months has not been as large as was hoped for. Indications are that stocks in manufacturers' hands are larger than they desire them to be at this season of the year, and that the fires are not likely to be started as early in September as usual. While Pittsburgh quotations show no change, Glass is being bought by jobbers at 80 and 20 per cent. discount, with an extra 2½ per cent. discount in some cases. It is made to appear that owing to the probable late start at the factories, the necessity of arranging

many plants for the use of artificial gas where natural gas has given out, together with the possible large demand for Glass this fall, that American Glass will advance in price. It is well to keep sight of the fact that there is little difference in the price of first quality American and second-quality French Glass at present, and that they are considered about equal in quality. Printed quotations are as follows: American Window Glass, in carloads, 80 and 10 per cent. discount; less than car lots, 80 and 5 per cent. discount; French Window Glass, 75 and 10 and 5 per cent. discount, with an additional 5 per cent. discount when 50 boxes are ordered and taken in any calendar month. American Plate is held at discount 50, 10 and 5 per cent., and Imported Plate at discount 60 per cent.

An Unfounded Rumor.

IN VIEW OF THE RUMORS that they intended to close the works of the Harvey W. Peace Saw Company, the following letter from Henry Disston & Sons will be read with interest:

PHILADELPHIA, August 17, 1891.

To the Editor of *The Iron Age*.—For some time past we have been in receipt of many inquiries as to the truth of the rumors which have been circulated relative to the closing of the Harvey W. Peace Saw Company's factory in Brooklyn, N. Y. Our salesmen have also reported to us that they have been asked the same question in different parts of the country, and in order to effectually settle the matter, and that the trade may know the true state of affairs, permit us to say that we have no intention whatever of closing this shop. We cannot imagine how the rumors could have originated and received such wide publicity, as we propose to continue to run these works, having no idea whatever of closing them down. Will you kindly, therefore, in justice to us, publish this fact, as we desire to speak in no uncertain tone on this subject.

Yours truly,

HENRY DISSTON & SONS, Incorporated.
S. DISSTON.

Trade Items.

G. W. VAN TINE & SON, 504 Commerce street, Philadelphia, Pa., have been appointed agents for that city for the sale of the goods manufactured by the Chieftain Company, Canton, Ohio.

SHIPPERS WILL TAKE NOTICE that the bark, Southern Cross, for Sydney, New South Wales, will sail about August 30. Particulars can be obtained from any of the exporting houses doing an Australian business.

ANNOUNCEMENT IS MADE that under date of July 7, 1891, the business heretofore conducted by Salem Copeland, Worcester, Mass., was organized into a stock company, the corporate name of which is the Copeland Hardware Mfg. Company, who will continue the manufacture of the Copeland Patent Extension Calipers and Dividers and other Hardware specialties, including the old style Cook Dividers.

WARREN M. BRINKERHOFF, president of the Brinkerhoff Company of Auburn, N. Y., and who for several years has had charge of the sales and legal department of A. W. Stevens & Son of that city, has been selected to manage the National Harrow Company and their licensees, who together do an annual business of several

millions of dollars. Mr. Brinkerhoff has held important positions in connection with large manufacturing establishments, and is especially well equipped for the discharge of the duties of the position which he has just assumed. It is stated that the formation of the National Harrow Company was largely due to Mr. Brinkerhoff's ability as an organizer.

H. C. WHITCHER has relinquished his position as buyer for the W. Bingham Company and has taken the agency for Ohio, Michigan and Indiana for a few first-class lines, including the Whitaker Iron Company, Lindsay & McCutcheon and the Chapin Bolt and Nut Company. His headquarters will be at Detroit, his old home. Mr. Whitcher is one of the best known Hardwaremen of the West.

JOSHUA OLDHAM COMPANY, 351 and 353 East Sixty-first street, New York, New York Saw Works, issue a prospectus of their company, who have been recently organized under the laws of the State of New Jersey, with Joshua Oldham, president; Lindley Murray, vice-president; Edward R. Oldham, secretary and treasurer; Harry I. Oldham, superintendent. The company are organized to take over and carry on the business established in 1870 by Joshua Oldham for the manufacture of Saws, Machine Knives, &c., especially Band, Gang and Circular Saws.

MERWIN, HULBERT & Co., 26 West Twenty-third street, New York, sole agents for Forbes' New Skate, are sending a circular letter to the trade relating to these goods. They state in this letter that last year the sale of these Skates was unexpectedly large, and that every sample order was duplicated many times before the close of the season. They urge their customers to send their orders now, for delivery in October and November, to insure the prompt delivery of the goods. An illustrated description of this Skate was given in *The Iron Age*, December 25, 1890.

IN A LETTER recently received from a prominent Omaha jobbing house, the advantages of that city as a purchasing center are thus referred to: "It becomes more apparent continually that our Western retail merchants are realizing the benefits and advantages to be derived by purchasing their goods in this metropolis. Immense stocks of all lines of goods are carried here and are unloaded at prices that Eastern competitors find it difficult to duplicate. Consequently by buying here they perceive the many advantages to be secured by ordering frequently. Less capital invested; less interest; less insurance; less freight to pay; fresh clean goods all the time, and all this without any increase in cost. It is not to be wondered at that sharp, shrewd, observing merchants are not slow in eagerly securing advantages such as these that we offer."

IN THEIR ADVERTISEMENT in another part of this issue Keystone Lock Works, Lancaster, Pa., for whom Surplus, Dunn & Alder are agents, 97 Chambers street, New York, call attention to their new line of Padlocks for the fall trade, illustrations being given of their No. 411 Solid Bronze Padlock and No. 121 Spring Self-Locking Scandinavian Padlock. The special features of these goods are referred to.

A VERY LARGE NUMBER of friends throughout the Hardware trade will be pained to learn of the death of R. A. Neal, for many years president of the Peck, Stow & Wilcox Company, a position which failing health caused him to relinquish a few years ago. His death occurred on Saturday, 15th inst., and the funeral took place from his late residence on Wednesday afternoon at 1 o'clock. Mr. Neal was a pioneer among the Hardware manufact-

urers of America, and we shall in a future issue give a more extended sketch of his career.

Export Notes.

THE EXPORT TRADE continues about as usual, although in the Australian Colonies, owing to stock taking, orders have been light. The wet weather has had a very depressing influence on the country trade, many of the roads being almost impassable.

The strike in Queensland has practically ended in the defeat of the unions, but in New South Wales, Victoria and South Australia the same trouble is likely to occur, as the shearing is now about commencing. At the recent election in New South Wales the labor party polled a very heavy vote, and now hold the balance of power in Parliament, and it is feared they will make serious trouble. The labor unions, having been defeated in most of their strikes, have turned their attention to the Legislature with a view to enforcing their demands through that source. This has unsettled affairs to such an extent as to cause an almost complete stagnation in business, and it is feared that there is little chance of New South Wales being able to float the loan which they must shortly apply for.

The city of Sydney was visited by a large fire, occurring at No. 512 George street, in the premises occupied by McLean Bros. & Rigg, ironmongers, and damage to the extent of £30,000 was done before the flames could be extinguished. The damage done to the stock of McLean Bros. & Rigg is estimated to be between £20,000 and £24,000. It was an extremely dangerous fire, as frequent explosions of gunpowder occurred, and sheets of iron and debris were thrown into the air. The building occupied by McLean Bros. & Rigg contained a valuable stock of Machinery, Ironmongery, &c., on the first and second floors; the top floor was used as a bulk store. It is presumed that McLean Bros. & Rigg will be only temporarily inconvenienced by the fire.

Regarding the condition of trade in Victoria, the Melbourne *Argus* writes as follows: "With this evening the trading year in some leading departments of trade closes, and to-morrow a new year commences. The second half of the closing year has on the whole yielded the most unfavorable results, as regards volume of trade, for a number of years past. With contraction there has been a long series of small assignments, which, in the aggregate, have made the bad debts account unusually heavy. Nor does this string of minor failures appear to have ended, for the suburban trade, plagued by losses arising from credits given during the strikes, by the shrinkage of sales and consequent increase of competition, and by heavy rentals, is not by any means in a healthy condition. The metal and Hardware trade has perhaps done better than other importing trades, notwithstanding the great falling off in the demand for Builders' Ironmongery, for imports were reduced at an early date, the result being

that improved prices have been obtained. It is difficult to gauge the immediate prospect, but it is generally expected that for the next two or three months both town and country trade will be quiescent."

Price-Lists, Circulars, &c.

M. D. CONVERSE, 90 Nassau street, New York: Eclipse Nail Puller. A catalogue entitled "A Story of the Eclipse," by M. D. C. This is descriptive of the Nail Puller, calling attention to its strong points; telling how it may be obtained, &c.

YAWMAN & ERBE, Rochester, N. Y.: Automatic Reels. They call attention to the new and improved Automatic Reel for 1891. They guarantee the best results in durability as well as strength, and warrant each Reel absolutely perfect. The Reels are made in two sizes, to carry 90 and 150 feet of line, and of five different styles—aluminum, hard rubber, gold bronze, nickel and brass.

E. BEMENT & SONS, Lansing, Mich.: Steel Plow Shapes and Cultivator Blades. In this catalogue they have attempted, by cuts and descriptions, to place in the hands of dealers the means of ordering just what is wanted, thus avoiding annoying errors and delays.

BANGOR EDGE TOOL COMPANY, Bangor, Maine: Lumbermen's and Loggers' Tools. Cant Hook, Straight Line Peavey, Mill Hook with Hog Nose, Solid Socket Pick Pole Irons, Cant Dog Handles, Pick Poles, &c. These goods are referred to as being first class in every respect, only the best material entering into their construction.

W. J. KELLEY & Co, Greenville, Ohio, with Chicago office 945 Rookery: Manufacturers' agents for Pumps, Rims, Shafts, Spokes, Poles, Single and Double Trees, Handles, &c. They state that they can furnish any of the above goods upon short notice.

MISSOURI MALLEABLE IRON COMPANY, St. Louis, Mo.: Plow and Wagon Clevises and Hardware specialties. A catalogue and price-list relating to these goods shows Clevises, Wrenches, Lariat Swivels, Picket Pins, Malleable D Handles, Set Collars, Rod Couplings, Lemon/Squeezers, Terry's Lap Link, Hay Pulleys, Shelf Brackets, Breast Strap Slicks, Wagon Jacks, &c.

PHOSPHOR BRONZE SMELTING COMPANY, Philadelphia, Pa.: Sole makers of Elephant Brand Phosphor-Bronze. Their price-list No. 8, for 1891, gives descriptions and tables of manufactured Phosphor-Bronze in roll and sheet metal, Wire, Wire Ropes and Cords, Tiller Ropes, Wire Cloth, Nails and Tacks, Rods and Bolts, Nuts and Washers, Wood Screws, Sash Chains and Fixtures, Split Links, Powder-Mill Tools, Castings, Ingots, &c.

It Is Reported—

That **Freeman & Gott** of LeGrange, Ohio, have purchased the Hardware, Stove and Tin business of **P. H. Merriam & Son** of the same town and will continue it in connection with their Agricultural Implement business.

That **Ruhlman & Miller**, Cardington, Ohio, are completing a large brick store into which they will move their stock of Hardware about September 15.

That **Geo. H. Englehart** has started a new Hardware store on St. Clair street, Collamer, Ohio.

That the firm of **Becks & Wensink** succeeds **B. H. Beck**, Hardware, &c., Cleveland, Ohio.

That the Hardware store of **C. M. Jones** of Ripley, N. Y., was burglarized on the 3d inst. Cutlery valued at \$75 was taken.

That **Bruce & Kimball**, formerly of North Creek, N. Y., have purchased the Hardware stock of **Rhodes Bros.** and the

Hardware and Furniture stock of **W. R. Ide**, Corinth, N. Y. The new firm will consolidate the two stocks thus purchased and will do a wholesale as well as a retail business.

That the Hardware store of **Charles M. Jenness**, at Quincy, Mass., was broken into on the 6th inst., and Knives, Scissors, Locks and Wrenches to the value of about \$30 were stolen.

That **Upshaw & Cherry**, Gainesville, Texas, are a new Hardware firm at that point.

That **Briggs & Babcock**, dealers in Hardware, South Omaha, Neb., have dissolved partnership, Mr. Babcock retiring. The other partner will continue the business.

That **Davis & Watson**, Pittsburgh, have let the contract for the erection of a large building to be occupied by their Hardware business.

That **Smith & Adams**, Hardware, &c., Worcester, Mass., have dissolved partnership. **Elwood Adams** will continue the business.

That **Harper & Atkinson** are successors to **J. E. Harper**, Hardware, Butler, Mo.

That **Maier & Palm**, dealers in Implements at Litchfield, Minn., will discontinue business.

That **Kirk Woodworth** is the proprietor of a new Hardware store at Minco, Indian Territory.

That **F. E. Downey** will open a new Hardware store at Paris, Ill., in a few weeks.

That **E. Capon** is putting up a fine Hardware store at Mankato, Minn.

That **Solon S. Laing** of East Otto has purchased the interest of **John A. Stevens** in the Hardware firm of **Stevens & Andrews** of Salamanca, N. Y., and will soon remove to that point.

That **Hollis Caswell**, Portland, Maine, is erecting a new building, which when completed he will occupy with his Hardware business.

That **Arthur Y. Reed** has purchased the interest of his partner, **A. E. Metcalf**, in the Hardware business of **Metcalf & Reed**, Elgin, Ill.

That **W. V. Elliott** has opened a Hardware store at Nogales, Ariz.

That **A. B. Peterson**, Hardware merchant, Blair, Wis., was burned out on the 27th ult.

That **N. S. Viall** is going out of the Hardware business at Southbridge, Mass., and will dispose of his stock at auction.

That **Maurer & Lederman** have opened a Hardware store at Madison, Ill.

That **E. A. Bodwell**, dealer in Hardware, Dixon, Ill., has sold out to **N. E. Kennedy**.

That **J. Arbuckle** is the proprietor of a new Hardware store at Esopus, N. Y.

That the **Westbrook Hardware Company** have opened a store on Main street, in Westbrook, Maine.

That **Fred. Woodworth** has opened a Hardware store at Onondaga, Mich.

That **D. L. Hamlin** is the style of a new Hardware firm at Navasota, Texas.

That **C. S. Martin & Co.**, Parnell, Mo., are contemplating erecting a new building for the accommodation of their increasing trade.

That **H. J. Goodrich**, St. Johnsbury, Vt., has enlarged his establishment by an addition, 20 x 20 feet, which permits him to carry a larger stock of Hardware, &c.

That **McHenry & Bailor's** Hardware store at Clinton, Ill., was burglarized recently. One Revolver and about \$40 worth of Knives were stolen. The burglars were arrested shortly after leaving the scene of their depredations and nearly all of the goods were recovered.

That **J. S. Thomas & Co.** have recently embarked in the Hardware and Stove business at Pomeroy, Wash.

That **Fels & Brown**, dealers in Hardware, Savannah, Ohio, have dissolved partnership, the former retiring. The business will be continued by Mr. Brown.

That **W. C. Burroughs** has bought out **W. J. English's** Hardware business at Trenton, N. J.

That **J. W. Herrick & Co.** are a new Hardware firm at South Braintree, Mass.

Exports.

PER BARK **LOTTIE MOORE**, JULY 21, 1891, FOR DUNEDIN, NEW ZEALAND.

By **William Lunham**.—11 packages Hardware.

By **W. K. Freeman**.—1 case Axes, 4 crates Churns.

By **R. W. Forbes & Son**.—2 barrels Wire, 3 cases Axes and Handles.

By **Alfred Field & Co.**.—3 dozen Hatchets, 1 case Silver-Plated Ware, 3 crates Churns.

By **The F. B. Wheeler Company**.—1 case Hardware, 3 cases Fire Arms, 2 racks Churns, 1 case Hardware.

By **W. H. Crossman & Bro.**.—1 dozen Pumps, 3 dozen Hatchets, 5 cases Hardware, 2 packages Meat Choppers, 8 packages Lamp Goods.

By **H. W. Peabody & Co.**.—8 packages Hardware, 4 cases Axes, 1 case Tacks, 1 package Air Rifles, 1 case Lamp Goods, 111 packages Agricultural Machinery, 6 packages Lamp Ware, 4 cases Axes, 1 case Hardware, 1 case Hardware, 1 case Plated Ware, 7 packages Lamp Ware, 1 package Egg Beaters, 1 case Pumps, 1 package Oilers, 1 bundle Sash Cord, 7 packages Hardware, 6 racks Churns, 1 case Scoops, 1 case Traps, 3 cases Hardware, 2 cases Agate Ware, 2 cases Axes.

FOR WELLINGTON.

By **McLean Bros. & Riog**.—12 dozen Hammers, 1000 Pot Scrapers, 1 gross Harness Menders, 10 dozen Axes, 425 pounds Horse Nails, 4 cases Axes, 3 cases Lamps, 1 case Plated Ware, 8 cases Axes, 3 dozen Curry Combs.

By **F. H. Lovell & Co.**.—13 cases Lamp Goods.

By **W. H. Crossman & Bro.**.—1 case Hardware, 6 dozen Knives, 10 pounds Oil Stone, 1 dozen Jacks, 6 dozen Brushes, 5 packages Rakes, 1 case Rakes, 1 case Agricultural Implements, 1 case Scales, 3 cases Hardware.

By **F. H. Lovell & Co.**.—3 packages Lamp Goods.

By **Mailier & Quereau**.—20 dozen Axes.

By **Coombs, Crosby & Eddy**.—20 dozen Axes.

By **The F. B. Wheeler Company**.—1 case Hardware, 1 case Bird Cages, 1 case Hardware, 2 cases Wringers, 3 cases Saws, 2 cases Hardware, 2 cases Hardware, 1 case Hammers.

By **Alfred Field & Co.**.—25 Stoves.

By **S. Hoffnung & Co.**.—12 gross Tinware, 36 gross Rules.

By **R. W. Forbes & Son**.—9 packages Hardware, 16 cases Axes and Hammers, 1 case Britannia Ware.

By **H. W. Peabody & Co.**.—2 dozen Picks, 12 dozen Hammers, 13 dozen Axes and Hatchets, 5 dozen Axes, 24 packages and 2 cases Hardware, 3 dozen Wringers, 12 bundles Step Ladders, 9 cases Hardware, 2 dozen Lemon Squeezers, 17 packages Hardware, 2 cases Traps, 1 case Plated Ware, 2 dozen Wringers, 5 cases Horse Nails, 1 case Hoes, 3 cases Bird Cages, 3 cases Saws, 7 packages Hardware, 1 case Wringers, 24 packages Hardware, 80 kegs Nails, 18 cases Edge Tools, 1 case Mills, 18 cases Hardware, 2½ dozen Wringers, 10 dozen Shovels, 28 dozen Tools, 2 dozen Churns, 14 Churns, 16 cases Hardware, 50 kegs Nails, 3 packages Stoves, 16 packages Hardware, 2 packages Wringers, 1 case Hardware.

PER BARK **ARAGADA**, JULY 24, 1891, FOR ADELAIDE, AUSTRALIA.

By **W. & B. Douglas**.—4 cases Pumps.

By **Rochester Lamp Co.**.—3 boxes Lampware.

By **Meriden Britannia Co.**.—7 packages Silver-Plated Ware.

By **Atlas Tack Co.**.—12 cases Nails.

By **Russell & Erwin Mfg. Co.**.—14 packages Hardware.

By **Sargent & Co.**.—16 packages Hardware.

By **R. H. Dana & Co.**.—3 cases Saws, 12 cases Wringers, 3 cases Axes.

By **Fairbanks & Co.**.—98 boxes Scales.

By **R. W. Forbes & Son**.—2 cases and 10 packages Hardware.

By **John A. Clifford**.—3 boxes Saws, 2 cases and 7 packages Hardware.

By H. W. Peabody & Co.—1 case Scales, 1 case Pumps.

By McLean Bros. & Rigg.—1 case Hardware, 2 cases Rifles, 1 case Locks, 6 cases Nails, 1 case Door Springs, 1 case Mouse Traps, 1 case Hammers, 1 case Drills.

By Wm. E. Peck.—6 packages and 8 cases Plated Ware.

By Arkell & Douglas.—9 cases Hose, 2 cases Tools, 1 case Cartridges, 1 case Nails, 1 case Bolts, 6 crates Stoves, 20 cases Tools.

By W. H. Crossman & Bro.—2 cases Agricultural Implements, 2 cases Wire Cloth, 4 cases Hardware, 2 cases Lamp Goods, 3 cases Wrenches, 1 case Drawing Knives, 1 case Oil Cans, 6 dozen Mangles, 3 crates Traps, 22 crates Stones, 50 cases Axes, 12 dozen Hatchets, 2 gross Lanterns, 1 case Traps, 10 packages Hardware, 5 dozen Wringers, 2 cases Pump parts.

By H. W. Peabody & Co.—3 gross Traps, 1 case Farming Implements, 44 packages Hardware, 2 packages Pumps, 2 cases Guns, 25 packages Hardware, 53 packages Stoves, 84 packages Hardware, 2 cases Farm Implements, 2 packages Pumps, 1 case Air Guns, 20 packages Hardware, 1 box Pumps, 15 cases Stoves, 1 case Mills, 1 case Traps, 2 cases Hardware, 3 cases Axes, 1 case Hardware, 1 case Freezers, 4 cases Hardware, 1 case Brushes, 35 crates Stoves, 8 cases Wringers, 6 cases Tacks, 15 packages Hardware.

By Mailler & Quereau.—13 cases Axes, 30 cases Axes.

PER SHIP LOCH CARRON, JULY 27, 1891, FOR MELBOURNE, AUSTRALIA.

By Winchester Repeating Arms Company.—45 Guns, 70,000 Cartridges, 50,000 Primers, 58 Guns, 84,000 Cartridges, 30,000 Cartridge Shells, 110,000 Primers.

By Reed & Barton.—4 packages Silver-Plated Ware.

By Rogers, Smith & Co.—15 packages Plated Ware.

By E. Bement & Sons.—5 boxes Agricultural Implements.

By Reed & Barton.—2 cases Plated Ware.

By Fairbanks & Co.—22 boxes Scales.

By Lalance & Grojean Mfg. Company.—6 cases Household Utensils.

By H. W. Peabody & Co.—82 cases Agricultural Machinery.

By W. K. Freeman.—6 dozen Picks, 1 box Drills, 2 packages Lamp Goods.

By Edward Miller & Co.—5 boxes and 10 packages Lamp Goods.

By Meriden Britannia Company.—33 packages, 2 boxes and 10 barrels Plated Ware.

By Woodhouse & Stortz.—15 dozen Edge Tools, 47 pounds Lamp Goods, 1 barrel and 5 cases Hardware, 2 cases Agricultural Implements.

By McLean Bros. & Rigg.—1 dozen Revolvers, 4 dozen Plows, &c., 1340 pounds Nails, 21 dozen Locks and Springs, 2 cases Plated Ware, 46 dozen Locks and Knobs, 74,000 Cartridges.

By R. W. Forbes & Son.—4 cases Lampware, 6½ dozen Wringers, 23 packages Hardware, 14 reams Flint Paper, 50 Axes, 19 packages Carriage Hardware, 2982 Carriage Bolts, 3 Tire Benders, 14 Stoves, 99 pounds Glue, 1 gross Wringers, 2 packages Hardware.

By Coombs, Crosby & Eddy.—3 Scales, 22 dozen Hardware, 21 dozen Hardware, 9 Wringers, 1 dozen Tinware, ½ dozen Rat Traps, 1 dozen Bush Hooks, 4 Lawn Mowers, 2 dozen Axes, 38 dozen Tools, 4 cases Plated Ware, 6 dozen Tools.

By Strong & Trowbridge.—6 dozen Axes, ½ gross Manila Paper, 5 Lawn Mowers, 5 Scales, 12 dozen Locks, 35 dozen Hardware, 55 dozen Lampware, 14 dozen Locks, 7 dozen Hardware, 10,000 Empty Shells, 13 Pumps, 6 dozen Hardware, 100 pounds Stone, 3½ dozen Shears, 1 dozen Sifters, ½ dozen Drills, 71,000 Cartridge Shells, 15 dozen Hay Knives, 2 dozen Hardware, 1 gross Shot Cases, 9 dozen Hardware, 3 dozen Hay Knives, 12 dozen Hardware, 12 dozen Fly Traps, 877 pounds Empty Shells, 56 pounds Cartridges, 45 Fire Arms, 349 pounds Empty Shells, 4 dozen Locks, 20 dozen Hardware, 8 dozen Door Springs, 4 dozen Nail Pullers, 63 pumps.

By R. W. Cameron & Co.—18 crates Refrigerators, 376 pounds Nuts and Bolts, 1 box Tools.

By Healy & Earl.—2 boxes Hardware, 5 boxes Drills, 9 Blowers, 1 case Blowers, 2 boxes Scales, 1 box Emery Wheels, 4 boxes Emery-Wheel Machinery, 3 barrels Lamps.

By H. W. Peabody & Co.—8 cases Machine Tools, 1 case Tire Upsetters, 20 tons Barb Wire, 1 case Floral Sets, 2 cases Rakes, 40 packages Nails, 10 cases Hardware, 24 dozen Mouse Traps, 4 cases Bolts, 51 packages Hardware, 20 tons Barb Wire, 20 cases Nails, 1 case Hardware, 3 cases Wire Cloth, 2 cases Sand Paper, 3 dozen Wringers, 93 packages Harvesting Machinery, 3 packages Lawn Mowers, 6 cases Carpet Sweepers, 50 cases Edge Tools, 2 cases and 25 packages Hardware, 1 package Glass Cutters, 14 pack-

ages Hardware, 2 cases Lampware, 18 cases Wringers, 5 packages Pumps, 64 packages Lampware, 1 case Lawn Sprinklers, 1 case Scales, 2 cases Rivets, 37 cases Hardware, 7 cases Edge Tools.

By R. H. Dana & Co.—90 cases Axes, 1 case Augers, 4 cases Bolts, 11 packages Nails, 2 cases Snaths, 2 cases Hardware, 1 case Pumps, 3 cases Forges, 1 case Miter Boxes, 4 cases Saws, 2 cases Washita Stones, 1 case Hammers, 3 cases Nails, 1 case Oilers, 2 cases Nails.

By W. H. Crossman & Bro.—3 dozen Traps, 1 gross Traps, 8 cases Hardware, 1 dozen Axes, 1 dozen Mallets, 1 dozen Call Bells, 1½ dozen Wringers, 10 cases Hardware, 4 dozen Scoops, 100 reels Barb Wire, 6 Vises, 1 dozen Axes, 33 dozen Freezers, 2 cases Pump Parts, 1 gross Files, 1 dozen Anvils, 8 dozen Lanterns, 1 dozen Wringers, 76 dozen Axes, 11 cases Lamp Goods, 1 case Lamp Goods, 5 packages and 2 cases Hardware, 2½ dozen Air Guns, 10,000 Fuses, 6 cases Hardware, 7 dozen Axes, 1 case Pump Parts, 31 packages and 3 cases Hardware, 42 pounds Tacks, 6 dozen Rakes, 6 packages and 4 cases Hardware.

By Strong & Trowbridge.—3 cases Hardware, 1 case Drills.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

The past week has been devoid of striking incident in this branch of trade. Reacting somewhat from the sharp rise that took place last week, the price of Pig Lead attracts less attention, and in the absence of any new move or sign of impending radical change in Linseed Oil, the latter commodity causes less uneasiness at the present time than it did a week ago. However, there is enough of the element of uncertainty in both lines to keep matters interesting to the wholesaler if not to the retailer, although not influencing operations to any marked extent. For that matter, business in all branches of the trade is still conducted on very conservative lines, and values undergo but little variation.

White Lead.—Corrodors generally state that sales of their chief production are well up to the average for the season and appear satisfied that the pure pigment is more than holding its own against the competition of the various mixed Leads that are upon the market. In some instances it is claimed that custom which was drawn away for a time by the apparent cheapness of the inferior pigment is gradually returning. Manufacturers of cheap Leads, while claiming no special gain, state that their sales are all that could reasonably be expected in view of the condition of general trade and extreme caution manifested by nearly all classes of buyers. At second hands there is some irregularity in prices, but producers adhere to the quotations that have prevailed for some time past.

Zincs.—Orders for American Oxide are coming in rather slowly at the moment, but the movement in delivery on old contracts continues to absorb the greater portion of the output, and with friendly relations between manufacturers maintained, prices remain steady. As previously noted in this column, preparations are making for a heavier production ere long, but it is claimed that the increase will be no greater than the prospective outlet fully warrants. In foreign Zincs there is nothing more than a routine trade, but current importations are well taken care of, and prices remain very steady.

Colors.—Lower prices ruling latterly for Quicksilver still excite some interest as to future rates for Quicksilver Vermilion, but the associated manufacturers adhere to former rates, and outsiders make no greater concessions than heretofore. On other dry Colors for house-painters' use there is nothing new to note, business be-

ing of about the usual volume for the season, and chiefly at about former prices. Oil Colors are without radical change in price and selling to a moderate extent only. Trade in Mixed Paints is also rather slow.

Miscellaneous.—Block Chalk is in about the same position that it was a week ago. The same may be remarked of Whiting, Paris White and Putty. Barytes and the general line of Clays are selling at about former prices, but rather slowly.

Oils and Turpentine.

In the Oil trade there has been a somewhat varied experience. Accounts differ as to the true inwardness of the Linseed situation and certain moves in Cotton-Seed Oil excite a little curiosity as to the real situation there. Olive and Coconut Oils still feel the effect of more or less anxiety on the part of holders to make sales, yet no further depreciation in values is to go on record. In other lines nothing has occurred calculated to disturb matters in the least, and while even slower than usual at this season of the year in some lines the general distribution affords a fair degree of satisfaction to sellers.

Linseed Oil.—The out-of-town interest make more or less pretension of firmness and quote 37¢ @ 38¢ as very close prices, but some buyers claim that carload lots may yet be secured at 36¢, and there are some indications also that need of funds is still an incentive to low offers on the part of a few Western crushers, and it is doubtful that efforts in the direction of establishing uniform prices are rewarded. Despite this rather uncertain condition of affairs, city crushers make no change in their prices, and it is asserted that local product is holding its own remarkably well against the outside competition in this market and immediate vicinity.

Cotton-Seed Oil.—Upward of 10,000 barrels refined Oil have been engaged for shipment to Europe recently. It is believed that a considerable portion goes on consignment, for account of the manufacturers, but several parcels were purchased outright by shippers, including about 600 barrels prime quality at 38¢. Home buyers have taken several lots of "off" grade, paying 32¢ @ 35¢. Crude product is in limited demand at the present time and the few sales made have been at about former prices. For 1891 crop, prime quality, 30¢ is asked and 28¢ bid, future delivery. Spot stocks are light and the few sales taking place are chiefly at former prices.

Fish Oils.—The Menhaden combine are doing nothing to speak of, owing chiefly to the fact that the catch of fish is still light. Buyers also manifest indifferent interest pending results in that connection and the outcome of a meeting called for next week. The manufactured products meanwhile are moving out very fairly at old prices, but to no greater extent than usual at this season of the year. In Sperm and Whale Oils there has been very little doing outside of the usual jobbing distribution of the refined product in a jobbing way.

Lard Oil.—Owing to higher cost of raw material, city pressers have advanced their price for prime quality Oil to 55¢ and at this writing 54¢ is evidently a strictly inside rate. Some Western brands may be secured at 53¢, but to a moderate extent only.

Miscellaneous.—There has been no further change in Olive or Coconut, but the market is rather weak and slow at the recent decline. Palm Oil fairly holds its own and Red Oils sell at former prices, but to a moderate extent only.

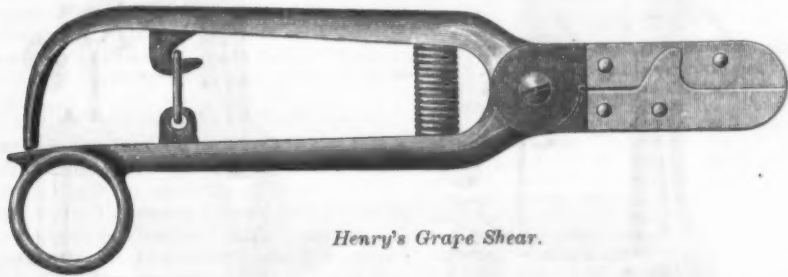
Spirits Turpentine.—For stock in regular barrels the price has been 36¢ nearly all the week, but machine barrels moved up to 37¢ and have been rather slow of sale at the advance.

Henry's Grape Shear.

John T. Henry & Son, Hamden, Conn., are introducing a grape shear, as illustrated herewith. It is described as having blades and jaws of the best cast steel, carefully tempered, the handles of refined malleable iron and all parts strictly interchangeable. The blade cannot slip by, as it passes through a slotted steel

oven heated by the circulation of hot water. Mr. Atkinson thereupon patented an improved form of the oven heated by hot air and arranged with Kenrick Bros. of Brookline, Mass., for its manufacture and sale.

In the accompanying illustrations we show general and sectional views of the Aladdin oven. The walls of the oven are made of non-conducting wood pulp, bound



Henry's Grape Shear.

around the edges with sheet metal. As shown in Fig. 1, it rests on four legs, on a stand supporting a lamp, the heat from this lamp, which, by the way, should have a circular wick, being all that is required to do the cooking. The outside measurements of the oven are 22 x 16 in. ches. Inside the wood pulp box D, Fig. 2, is a non conducting packing, C, next an

around the edges with sheet metal. As shown in Fig. 1, it rests on four legs, on a stand supporting a lamp, the heat from this lamp, which, by the way, should have a circular wick, being all that is required to do the cooking. The outside measurements of the oven are 22 x 16 in. ches. Inside the wood pulp box D, Fig. 2, is a non conducting packing, C, next an

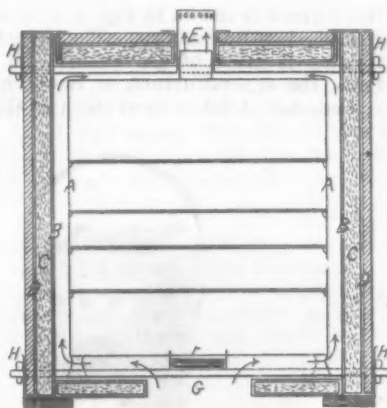


Fig. 2.—Vertical Section through Oven.

open space, B, 2 inches wide, through which the hot gases from the lamp circulate. A is the oven proper, which is 18 inches long by 12 inches deep, 14 inches high. It rests on short legs on the bottom of the wood pulp box. G is the bottom opening under which the lamp is placed, and F is a packing to prevent the lamp from overheating the bottom of the oven at that spot. The inside of the oven is fitted with four movable shelves, as shown in Fig. 2.

It will be observed that there is no direct connection or no open connection between the flame of the lamp and the top of the chimney with the inner oven in which the food material is placed. This inner oven is substantially tight, the ventilator in the top communicating through the outer oven with the inner oven, rendering any extreme pressure of steam or vapor impossible. The food is therefore cooked in the humidity which is developed, but as the heat is not raised to the distilling point there is no taint of one kind of food carried over to another. Neither does any harm come if, by accident, the lamp smokes. What little soot is formed is deposited on the outside of the inner oven, and neither the taint of the smoke nor the smell of the kerosene ever reaches the food.

From a pamphlet distributed by Kenrick Brothers we reprint the following remarks on the use of the Aladdin oven:

This oven has now been perfected so that it can be applied to roasting, baking

stewing or simmering, and to a process corresponding to that of broiling.

The heat required is derived from a Rochester, Daylight or Banner lamp, consuming 1 quart of kerosene oil in about eight hours. Oil of 150° flash test is considered the best and safest. The oven may be worked with gas, consumed through a Bunsen burner, at the rate of 4 to 6 feet of gas per hour. Fish, meat, vegetables and puddings or pies may be thoroughly cooked in the same oven at the same time without any flavor of one being imparted to the other; because, when the lamp is of suitable size as compared to the oven, the heat in the oven cannot be raised high enough to distil the juices or dissociate the fats.

A four-course dinner, consisting of fish, entrée, roast, three vegetables and pudding, pie or cake, may be cooked in one oven at the same time, in quantities sufficient for eight persons, with an expenditure of about 1 pint of oil. Soup made the day before may be reheated at the same time. Each course may be cooked in the dish in which it is to be served, and the work may be done as well on a side table in the dining room as in the kitchen. The only attention required is to put each dish in at the right time.

Bread may be both raised and baked in this oven by following certain directions, but a bread raiser is desirable in order to save the time of the oven. Perfect bread may be made according to instructions, which will be given, without wasting any time or work upon the process of kneading by hand; white flour bread or whole wheat bread completed in five or six hours from the time of working the materials together with a spoon or with a bread kneader; rye bread in about six hours; brown bread as long as you please to bake it.

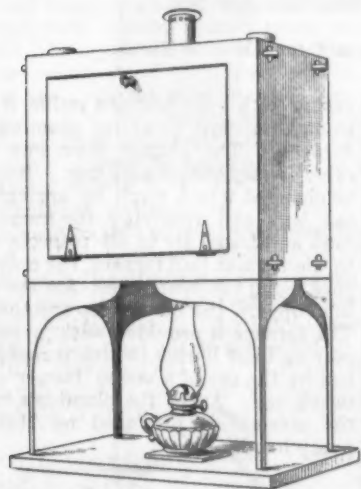
The Taylor Fruit Press.

The Taylor Novelty Company of Muscatine, Iowa, are offering the trade a fruit and jelly press, of which we present an illustration. The press may be used as a wine, fruit or vegetable press, and also as a sausage filler. It is claimed that it is economical in operation and easy to use.



The Taylor Fruit Press.

It may be also used for stuffing poultry. The cylinder of this press can be used as a steam cooker by setting it into a basin of boiling water. The parts are made interchangeable and very strong. The cylinder is made of XXXX tin imported for the purpose. The Taylor Novelty Company will also manufacture other specialties in the hardware line, but at present this press will be given especial attention. They have just built and occupied a large building filled with machinery made for their use, which gives them a capacity of about 200 presses per day, which may be increased as the business warrants.



The Aladdin Oven.—Fig. 1.—General View of Oven.

palatable and more nutritious food. With this end in view he did not patent his first device, but delivered lectures and published pamphlets describing its construction and operation. Experience proved, however, that as the article was not protected by patents no one took an especial interest in its manufacture. This was an

Power Crimping Tool.

The Bridgeport Gun Implement Company, Bridgeport, Conn., 813-315 Broadway, are putting on the market a crimping tool, as illustrated in Figs. 1 and 2. This consists of a cup attached to a cylinder, in which is an expansive follower and burnisher, actuated by a spring, the whole being nickel-plated metal, finished in a workmanlike manner. In operation the follower presses upon the wad irrespective of the size of the load, and virtually restores the interior surface of the

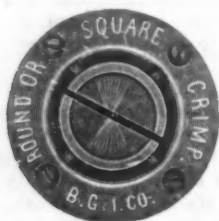


Fig. 1.—Front View of Crimping Cup.

shell, making the broken texture of the paper smooth as before, and gives by its neat, close, even crimp, setting squarely upon the wad, the uniform pressure so much desired. The same cup produces both a round and square crimp, the appearance of the square crimp being shown in Fig. 3, by simply reversing the steel crimping pins, which can be done at will, according to the crimp desired. This tool is designed for use in an ordinary foot power lathe by dealers who make a business of loading shells. It is stated that the trap

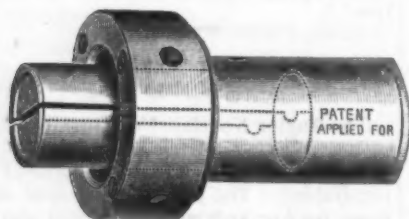


Fig. 2.—Side View of Crimping Tool.

shooter of to-day demands the most perfect ammunition, and that the advent of nitro-powders renders it difficult for dealers who load special charges for their customers to get a perfect crimp of different lengths and uniform pressure upon the wads. The manufacturers claim that the tool will crimp shells of different sizes; that it turns down a short or long crimp, as desired, and that all the wearing parts of the tool are made of hard metal. The suggestion is made that by its use a



Fig. 3.—Shell, Showing Square Crimp.

round crimp may be used for charges of one sized shot, and a square crimp for charges of another size, thus obviating blurred markings on the wad. Another style and size of crimper is to be made for sportsmen's use, attached to a closer, specially made for the tool, designed to produce the very best work in square and round crimp.

Hull's Improved Plumbers' Lead Furnace.

A new form of lead furnace is manufactured and sold by M. L. Hull, 24 Broadway, Cleveland, Ohio. A general view of

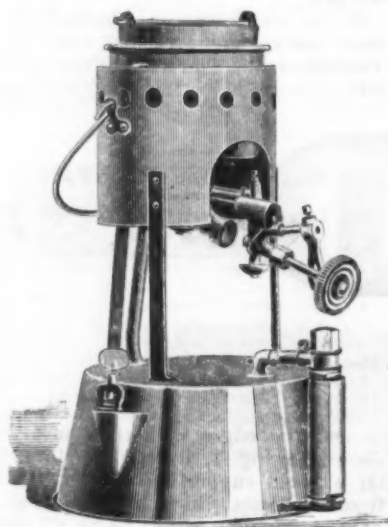


Fig. 1.—Hull's Improved Plumbers' Lead Furnace.

this furnace is shown in Fig. 1 of the accompanying illustrations. The tank of the furnace is made of galvanized iron and brass, the superstructure, or frame, being constructed of flat or sheet steel, as shown

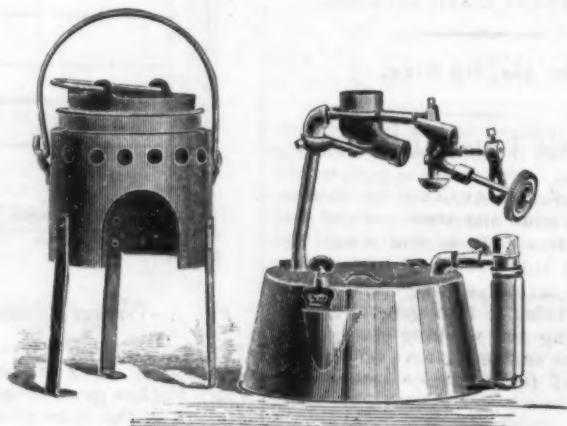


Fig. 2.—Furnace Taken Apart for Use as a Torch.

in the cut. The legs are sprung on, and when the tank and burner are to be used as a torch the top frame is taken off. In Fig. 2 the furnace is shown taken apart for use as a torch. The lead pot stands loosely inside of a removable casing with room enough for the flame to circulate around

The burner is described as powerful and simple with open-top blast pressure operated from the front by a wooden wheel hand which cannot get hot. The fire is started by

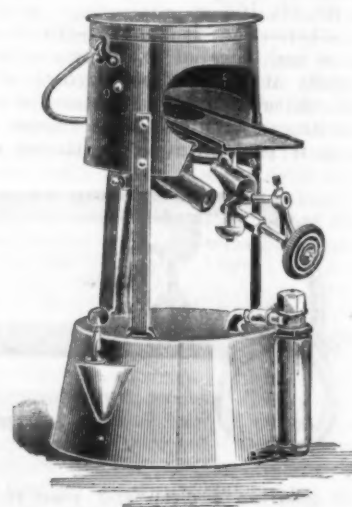


Fig. 3.—Hull's Improved Combination Furnace.

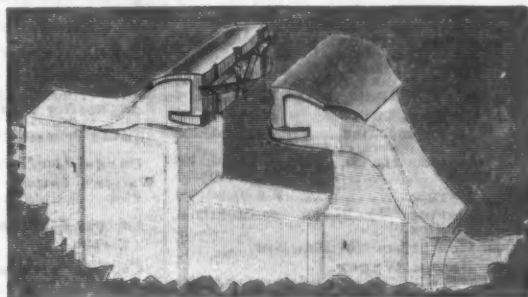
a lever valve and a sub-flame without filling the cup. This sub-flame, it is pointed out, can remain burning continuously with the main burner if desired and can also be used to keep the burner hot between jobs or during any interruption. The Combination furnace shown in Fig. 3 is for plumbers and tinner's and is intended for bench and outdoor use. By taking off the cast-iron cover and setting the removable

casing with loose lead pot inside, it is said to make a most powerful plumbers' lead furnace. The change from one to the other is very simple and easy. It can also be changed into a torch by springing out the legs and removing the frame. The tank and frame are in all respects similar to the regular lead furnace, the only difference being the center rest for the soldering coppers, the burner cap and the cover. The furnace is provided with a powerful roaring blast burner, which is made noiseless by the use of a sawed burner cap for bench use. As in the plumber's furnace, the pressure is produced by Hull's air-pump handle.

The Bingham Vise-Jaw Caps.

Prentiss Vise Company, 44 Barclay Street, New York, manufacturers of vises, are introducing Vise-Jaw Caps, as illustrated herewith. These consist of malleable castings, with a stop at one end of each and grooves on the faces. To adjust the caps, they are placed on the jaws and the vise screwed up. The tops of the caps are then hammered down to conform to the

shape of the upper part of the jaws. When the stops at the end of the faces abut against the ends of the vise jaws the corresponding grooves in a pair of caps will be opposite each other, so any size cap may be used with any width jaw. It is, however, preferable to have the cap the same length as the width of the jaw to which it is to be attached. These caps are designed to protect finished work when clamped in a vise, and also for securely holding, without injury, round, oval, square, polygonal, and other shaped fin-



The Bingham Vise-Jaw Caps.

ished rods. For the latter purpose the grooves are of various sizes, and at various angles. It is suggested that for holding the shank of a tap, when finishing out the flutes with a file, and for a hundred and one kindred operations, these caps will be found invaluable. The caps are made in three sizes, $3\frac{1}{2}$, 4, and $4\frac{1}{2}$ inches long.

Pointed Picture Hooks.

Pointer Picture Hook Company, Adrian, Mich., are offering the trade pointed picture hooks, as shown in Figs. 1 and 2.



Fig. 1.—Pointed Picture Hook.

The point on either hook allows the hook to be elevated to the molding with the picture attached, by the use of any stick long enough to reach the molding. The



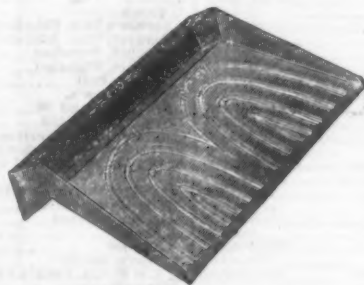
Fig. 2.—Wire Pointed Picture Hook.

advantage claimed for this device is that pictures may be hung or taken down without the person being obliged to stand on anything but the floor, thus avoiding any possibility of endangering life or limb.

The hooks shown in Fig. 1 are made in a variety of sizes and styles, finished in nickel, gilt, copper, &c., both plain and ornamental. Those shown in Fig. 2 are made of steel wire, very strong, and are referred to as presenting a fine appearance on the molding.

The Downing Dust Pan.

The Downing Dust Pan Company, 1210 and 1212 West Ninth street, Kansas City, Mo., are offering the trade a dust pan, as



The Downing Dust Pan.

top, deflects the dirt into the box. It is claimed that the pan rests firmly upon the floor; that it will hold and not spill the dirt; that it is durable in construction, and that it is unnecessary for the sweeper to stoop, thus saving the back.

Locomotive Cranes that Handle 100 Tons.

In the erection shop in the Baldwin Locomotive Works, Philadelphia, there has recently been put in some lifting machinery, the most powerful in the country, built by William Sellers & Co. There are practically two cranes. The shop is divided longitudinally by an iron truss supported on pillars, and from this truss to the walls of the shop on both sides extend the cranes. They look more like a single closed truss railroad bridge than anything else, and a pretty good idea can be gotten of their appearance in operation by imagining one of these bridges to move sideways up the street it spans. They run on two tracks each, one of which is on the central truss and the other on the side walls of the shop. Electricity is the motive power used, and the tracks are fitted with racks into which the drivers gear, thus pushing it along.

The capacity of these cranes is 100 tons. They are constructed with four hoisting speeds—5, 10, 20 and 40 feet per minute; two speeds at which the trolley may be run across, 50 and 100 feet per minute,

and along the shop they have gearing for the two speeds, 2 and 100 feet per minute. These speeds are merely those at which the parts will run when the corresponding gearing is connected, and any speed from the maximum down to zero can be obtained without difficulty.

At a recent trial the immense hook was lowered till it touched the floor, and, the foreman having given the signal fast, it was lifted till the chain was completely wound on the barrel, a distance of 38 feet, in 1 minute and 32 seconds. A trial was also made of the speed along the shop, and the crane traveled 144 feet in 37 seconds. The power is supplied by a 100 horse-power Westinghouse engine that runs a slow-speed United States dynamo, which supplies the current to two copper tracks that run the entire length of the shop, and from there it runs to the motor on the crane. There is one of these on each crane of 40 horse-power each, so that the net efficiency of the two conversions from engine to dynamo and from dynamo to motor is 80 per cent.

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CURRENT HARDWARE PRICES.

AUGUST 19, 1891.

No's.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobber, at the figures named.

Adjusters, Blind.

Domestic..... \$ dos \$3.00, 33¢
Excelsior..... \$ dos \$10.00, 50¢
Washburn's Self-Locking..... 30¢
Shells, &c.

Ammunition—See Caps, Cartridges.

Anvils.

Eagle Anvil, \$ 104..... 15¢
Peter Wright's..... 11¢
Armstrong's Mouse Hole..... 10¢
Armstrong's Mouse Hole, Extra..... 12¢
Trenton..... 10¢
Wilkinson's..... 10¢
Moore & Barnes Mfg. Co..... 30¢

Anvil Vise and Drill.

Millers Falls Co., \$18.00..... 30¢
Cheney Anvil and Vise..... 25¢
Allen Anvil and Vise, \$3.00..... 45¢
Star..... 45¢

Apple Parers—See Parers, Apple, &c.

Augers and Bits.

Douglas Mfg. Co..... 70¢
Wm. A. Ives & Co..... 70¢
Humphreysville Mfg. Co..... 70¢
French, Swift & Co. (F. H. Beecher, P. S. & W. Co.)..... 70¢
Rockford Bit Company..... 70¢
Cook's, Douglas Mfg. Co..... 55¢
Cook's, N. H. Copper Co. 50¢
Ives' Circular Lip..... 50¢
Patent Solid Head..... 30¢
C. E. Jennings & Co., No. 10, extension lip..... 40¢
C. E. Jennings & Co., No. 30..... 50¢
C. E. Jennings & Co., Auger Bits, \$ set, 32¢
Lewis' Patent Single Twist..... 45¢
Russell Jennings' Augers and Bits..... 40¢
Imitation Jennings' Bits..... 60¢
Snell's Jennings Pattern..... 50¢
Fug's Black..... 50¢
Rockford, Jennings' Pattern..... 50¢
Car Bits..... 60¢
Car Bits, P. S. & W. Co..... 60¢
Snell's Car Bits..... 60¢
L. Hommedieu Car Bits..... 15¢
Forstner Pat. Auger Bits..... 20¢
Cincinnati Bell-Hangers' Bits..... 30¢

Bit Stock Drills.

More Twist Drills..... 50¢
Standard..... 50¢
Cleveland..... 50¢
Syracuse, for metal..... 50¢
Syracuse, for wood (wood list) 50¢
Williams' or Holt's, for metal 50¢
Williams' or Holt's, for wood..... 40¢
Cincinnati, for wood..... 30¢
Cincinnati, for metal..... 40¢

Expansive Bits.

Clark's small, \$18; large, \$30, 35¢
Ives' No. 4, \$ dos \$30..... 40¢
Swan's..... 40¢
Steer's No. 1, \$30; No. 2, \$25..... 35¢
Stearns' No. 2, \$48..... 30¢

Gimlet Bits.

Common..... \$ gross \$2.75, \$3.25
Diamond..... \$ dos \$1.10..... 25¢
See..... 25¢
Double Cut, Rhendardson's..... 45¢
Double Cut, Ct. Valley Mfg. Co..... 50¢
Double Cut, Hartwell's, \$ gro..... 45¢
Double Cut, Douglas..... 40¢
Double Cut, Ives..... 50¢

Hollow Augers.

Ives..... 33¢
French, Swift & Co..... 33¢
Douglas..... 33¢
Bonney's Adjustable, \$ dos \$48..... 40¢
Ives' Expansive, each \$4.50..... 50¢
Universal Expansive, each \$4.50..... 50¢
Wood's..... 35¢
Cincinnati Adjustable..... 25¢
Cincinnati Standard..... 25¢
Ship Augers and Bits.....
L. Hommedieu's..... 15¢
Watrous..... 15¢
Snell's..... 15¢
Snell's Ship Auger Pat'n Car Bits..... 15¢

Awl Hairs—See Hairs, Awl.

Awls, Brad Sets, &c.....
Awls, Sewing, Common \$ gr \$1.70, 45¢
Awls, Should, Peg, \$ gr \$3.45, 50¢
Awls, Pat. Peg, \$ gr 68¢..... 50¢
Awls, Shouldered Brad, 2.70 \$ gr..... 35¢
Awls, Handled Brad, \$7.50 \$ gr..... 45¢
Awls, Handled Scratch \$ gr \$7.50, 35¢
Awls, Socket Scratch, \$ dos \$1.50, 25¢
Awls and Teel Sets—See Sets, Awl and Tool.

Axes.

Plain, Beveled.
First quality, best brands \$7.00 @ \$7.50
First qual., other brands 6.25 @ 6.75
Second quality..... 6.00
Axle Grease—See Grease, Axle.

Axles.

No. 1, 4¢ @ 5¢, No. 2 5¢ @ 6¢
Nos. 7 to 14..... 55¢
Nos. 15 to 18..... 47¢
Nos. 19 to 22..... 70¢
Concord Axles, loose collar..... 5¢
Concord Axles, solid collar..... 6¢
National Tubular Self-Oiling..... 25¢
Bog Holders.—See Holders, Bog.

Balances.

Spring Balances..... 40¢
No. 3000 30 20
Chatillon, \$ dos..... 30.90 0.96 1.76 net
Chatillon Straight Balances..... 40¢
Chatillon Circular Balances..... 60¢

Barb Wire.—See Wire, Barb.

Bars.

Cross—
Cast Steel..... \$ 3 1/2
Iron, Steel Points..... \$ 3 1/2

Basins, Wash.

Standard Fiberglass, No. 1, 10 1/2-inch, \$3;
12-inch, \$3.25; 13 1/2-inch, \$3.75; 15-inch,
\$3.25.

Beams, Scale.

Scale Beams, List Jan. 12, '89..... 50¢
Chatillon's No. 1..... 40¢
Chatillon's No. 2..... 50¢
Custer's..... 35¢

Benders.

Dover..... \$ dos \$1.50
Duplex (Standard Co.)..... \$ dos \$1.25
Rival (Standard Co.)..... \$ dos \$1.00
Duplex Extra Heavy (Standard Co.)..... \$ dos \$3.50

Bryant's..... \$ gro \$14.00
Double (H. & R. Mfg. Co.)..... \$ gro \$3.00
\$12.00; No. 1, \$15.00; No. 2, \$36.00
Easy (H. & R. Mfg. Co.)..... \$ gro \$12.00
Triple (H. & R. Mfg. Co.)..... \$ gro \$16.50
Spiral..... \$ gro \$4.25 @ 4.50
Improved Acme (H. & R. Mfg. Co.)..... \$ gro \$9.00

Paine, Diehl & Co.'s..... \$ gro \$24.00
Silver & Co..... \$ dos \$5.50

Keystone, F.D. & C., Each, No. 1, \$1; No. 2, \$2..... 30¢

Bells.

Common Wrought..... 60¢
Western..... 60¢
Kentucky, "Star"..... 60¢
Kentucky, Sargent's list..... 70¢
Kentucky Durham..... 70¢
Dodge, Genuine Kentucky..... 70¢
Texas Star..... 50¢
Door..... 35¢
Gong, Abbe's..... 40¢
Gong, Yankee..... 40¢
Gong, Barton's..... 40¢
Crane, Taylor's..... 25¢
Crane Brooks..... 50¢
Crane Cone's..... 10¢
Crane, Connel's..... 40¢
Lever, Sargent's..... 60¢
Lever, Taylor's..... 25¢
Lever, Taylor's Japanned..... 25¢
Lever, R. E. M. Co.'s..... 50¢
Pull, Brook's..... 60¢
Pull, Western..... 25¢

Electric..... 20¢
Bicycle & Downe..... 20¢
Taylor's..... 20¢

Hand—
Light Brass..... 75¢
Extra Heavy..... 85¢
White Metal..... 60¢
Silver Chime..... 35¢
Globe Cone's Patent..... 25¢

Miscellaneous..... 40¢
Farm Bells..... \$ 2 1/2 @ 3 1/2
Steel Alloy Church and School Bells..... 40¢

Blacksmiths..... 60¢
Molders..... 40¢
Hend's..... 40¢

Belting, Rubber—
Common Standard..... 70¢
Standard..... 70¢
Extra..... 60¢
N.Y.B. & P. Co., Carbon..... 60¢
N.Y.B. & P. Co., Diamond..... 60¢
N.Y.B. & P. Co., Para..... 40¢

Bench Steps—See Steps, Bench.

Benders, Upsetters, Tire.
Stoddard's Lightning Tire Upsetters..... 15¢
Detroit Perfected Tire Bender..... 15¢

Bits—
Auger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—
Ordinary Tackle, list May 30, 1890..... 70¢
Cleveland Block Co., Mal. Iron..... 50¢
Moore's Novelty, Mal. Iron..... 50¢
Sure Grip Steel Tackle Blocks..... 25¢

Boards, Stove.
Wood Lined "Crystal"..... See Trade
Paper Lined Zinc..... Report.
"Oxidized".....
"Crystal".....
"Embossed".....
"Oxidized".....

Boils—
Carriage, Machine, &c.—
Com. list June 10, '84..... 75¢
Genuine Eagle, list Oct. '84..... 75¢
Phila. pattern, list Oct. '84..... 80¢
R.B. & W., old list..... 70¢
Machine, list Jan. 1, 1890..... 75¢
Bolt Ends, list Jan. 1, 1890..... 75¢

Door and Shutter—
Cast Iron Barrel, Square, &c..... 70¢
Cast Iron Shutter Bolts..... 70¢
Cast Iron Chain (Sargent's list)..... 55¢
Ives' Patent Door Bolts..... 60¢
Wrought Barrel..... 70¢
Wrought Square..... 70¢
Wrt Shutter, all Iron, Stanley's..... 60¢
Wrt Shutter, Brass Knob..... 60¢
Wrt Shutter, Sargent's list..... 50¢
Wrt Sunk Flush, Sargent's list..... 55¢
Wrt Sunk Flush, Stanley's list..... 50¢
Wrt B.K. Flush, Com'n..... 55¢

Stove and Plow.

Stove..... 60¢
Plow..... 60¢
R. B. & W., Plow..... 65¢

Tire.

Common, list Feb. 28, '83..... 65¢
Port Chester Bolt and Nut Company:
Empire, list Feb. 28, '83..... 65¢
Keystone, Philadel., list Oct. '84..... 80¢
Norway, Phila., list Oct. '84..... 75¢
American Screw Company:
Norway, Phil., list Oct. 16, '84..... 75¢
Nos. 22, 23, 25..... 60¢
Philadel., list Oct. 16, '84..... 80¢
Bay State, list Feb. 28, '83..... 65¢
R.B. & W., Philadel., list Oct. 16, '84..... 80¢

Bores, Tap.

Common and Blind..... 30¢
Ive's Tap Bore..... 33¢
Enterprise Mfg. Co..... 30¢
Clark's..... 35¢

Borax.

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon.

Per 2..... 24¢

Braces.

American Bit Brace Co.:
Nos. 10, 12, 20..... 60¢
Nos. 11, 21, 24, 27..... 70¢
Nos. 22, 23, 25..... 60¢
Nos. 13, 20, 26, 37..... 70¢
Ball Braces, net..... \$1.12 to \$1.25
Amidon:
Barker's Imp'd Plain..... 75¢
Barker's Imp. Nickeled..... 65¢
Ratchet..... 75¢
Eclipse Ratchet..... 60¢
Globe Jawed..... 60¢
Corner Brace..... 40¢
Universal, 8 in., \$3.10; 10 in., \$2.25
Buffalo Ball..... \$1.10 @ \$1.15

Barber's..... 50¢
Nos. 30 to 33..... 50¢
Nos. 40 to 63..... 50¢

Saxton's:
Barker's Imp. Polished..... 75¢
Barker's Imp. Nickeled..... 65¢
Ratchet, Polished..... 60¢
Ratchet, Nickeled..... 40¢
Buffalo Ball..... net, \$1.10 @ \$1.15

Bartholomew's:
Nos. 25, 27 and 30..... 50¢
Nos. 117, 118, 119..... 70¢
Common Ball, American..... \$1.00 @ \$1.10
Fray's Genuine Spotted's..... 50¢
Fray's No. 70 to 130, \$1 to 125, 50¢ to 41¢

Ives' New Haven Novelty..... 70¢
New Haven Ratchet..... 60¢
Barber Ratchet..... 60¢
Barbers..... 60¢
Spotted..... 60¢
Osmond's Ratchet..... 40¢
P. S. & W. Co., Peck's Patent..... 60¢

Buckets, Well.

Galvanized—
Hill's..... \$ dos, 12 qt. \$4.25; 14 qt. \$4.2
Iron Clad..... \$ dos, 14 qt. \$4.30 @ \$4.8
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... \$ dos \$4.00

Bull Rings—See Rings, Bull.

Butchers' Cleavers—See Cleavers, Butchers'.

Butts—
Brass—
Wrought Brass..... 75¢
Cast Brass, Tiebout's..... 50¢
Cast Brass, Corbin's, Fast..... 35¢
Cast Brass, Loose Joint..... 35¢

Cast Iron—
Fast Joint, Narrow..... 50¢
Fast Joint, Broad..... 50¢

Loose Joint, Japanned..... 70¢
Loose Joint, Jap. with Acorns..... 70¢
Parliament Butts..... 70¢
Mayer's Hinges..... 70¢
Loose Pin, Acorns..... 70¢
Loose Pin, Acorns, Japanned..... 70¢
Plated Tip..... 70¢

Wrought Steel—
Fast Joint, Narrow..... 70¢
Fast Joint, L. Narrow..... 70¢
Fast Joint, Broad..... 70¢
Loose Joint, Broad..... 70¢
Table Butts, Back Flaps, &c..... 70¢
Inside Blind, Regular..... 70¢
Inside Blind, Light..... 70¢
Loose Pin..... 70¢
Bronzed Wrought Butts..... 30¢

Calipers—See Compasses.

Calks, Toe—
Gautier, One Prong, Blunt..... 5¢
Burke's, One Prong, Blunt..... 5¢
Burke's, Two Prong, Blunt..... 7¢
Burke's, One Prong, Sharp..... 5¢

Can Openers—See Openers, Can.

Caps.

Percussion, \$ 1000—
Hicks & Goldmark's and Union Metallic
Cartridge Co.
F. L. Waterproof, 1-10's..... 35¢
E. B. Trimmed Edge, 1-10's..... 47¢
E. B. Grind. Edge, Cent. Fire, 1-10's..... 47¢
Musket Waterproof, 1-10's..... 50¢
G. D..... 37¢
A. B. Genuine Imported..... 45¢
Hoy's E. B..... 55¢
Hoy's D Waterproof, Central Fire..... \$1.00

Primers—
Borden Primers, \$1.00..... 25¢
B. L. Caps (for Sturtevant Shells) \$1.00..... 25¢

All other Primers, \$1.30..... 25¢

Cards—List January 23, 1891.
Watson's Cotton, Wool, Horse and
File..... 25¢

Carpet Stretchers—See Stretchers, Carpet.

Carpet Sweepers—See Sweepers, Carpet.

Cartridges—
Aim Fire Cartridges..... 50¢
Aim Fire Military..... 15¢
Cent. Fire, Pistol and Rifle..... 25¢
Cent. Fire, Military and Sporting..... 15¢
Blank Cartridges, except 22 and 35 cal.,
additional 10% on above discounts.
Blank Cartridges, 22 cal., \$1.75..... 25¢
Blank Cartridges, 35 cal., \$3.50..... 25¢
Primed Shells and Bullets..... 15¢
A. B. Caps, Round Ball, \$1.75..... 25¢
A. B. Caps, Con. Ball, Swgd., \$2.00..... 25¢

Casters—
Red..... 55¢
Plate..... 55¢
Shallow Socket..... 60¢
Deep Socket..... 40¢
Yale Casters, list May, 1894..... 30¢
Tale, Gem..... 50¢
Martin's Patent (Phoenix)..... 45¢
Payson's Anti-Friction..... 60¢
Giant Truck Casters..... 30¢
Stationary Truck Casters..... 50¢
Socket Truck Casters..... 50¢

Cattle Leaders—See Leaders, Cat-
tle.

Cement.

Victor Elastic..... 5¢ pails \$ 5¢

Chain—
Trace, Wagon and Fancy Chains.
List revised April 21, 1890..... 60¢
American Coll. in case lots..... 60¢
3-16 5-16 7-16 9-16 11-16 13-16 15-16 17-16 19-16 21-16 23-16 25-16 27-16 29-16 31-16 33-16 35-16 37-16 39-16 41-16 43-16 45-16 47-16 49-16 51-16 53-16 55-16 57-16 59-16 61-16 63-16 65-16 67-16 69-16 71-16 73-16 75-16 77-16 79-16 81-16 83-16 85-16 87-16 89-16 91-16 93-16 95-16 97-16 99-16 101-16 103-16 105-16 107-16 109-16 111-16 113-16 115-16 117-16 119-16 121-16 123-16 125-16 127-16 129-16 131-16 133-16 135-16 137-16 139-16 141-16 143-16 145-16 147-16 149-16 151-16 153-16 155-16 157-16 159-16 161-16 163-16 165-16 167-16 169-16 171-16 173-16 175-16 177-16 179-16 181-16 183-16 185-16 187-16 189-16 191-16 193-16 195-16 197-16 199-16 201-16 203-16 205-16 207-16 209-16 211-16 213-16 215-16 217-16 219-16 221-16 223-16 225-16 227-16 229-16 231-16 233-16 235-16 237-16 239-16 241-16 243-16 245-16 247-16 249-16 251-16 253-16 255-16 257-16 259-16 261-16 263-16 265-16 267-16 269-16 271-16 273-16 275-16 277-16 279-16 281-16 283-16 285-16 287-16 289-16 291-16 293-16 295-16 297-16 299-16 301-16 303-16 305-16 307-16 309-16 311-16 313-16 315-16 317-16 319-16 321-16 323-16 325-16 327-16 329-16 331-16 333-16 335-16 337-16 339-16 341-16 343-16 345-16 347-16 349-16 351-16 353-16 355-16 357-16 359-16 361-16 363-16 365-16 367-16 369-16 371-16 373-16 375-16 377-16 379-16 381-16 383-16 385-16 387-16 389-16 391-16 393-16 395-16 397-16 399-16 401-16 403-16 405-16 407-16 409-16 411-16 413-16 415-16 417-16 419-16 421-16 423-16 425-16 427-16 429-16 431-16 433-16 435-16 437-16 439-16 441-16 443-16 445-16 447-16 449-16 451-16 453-16 455-16 457-16 459-16 461-16 463-16 465-16 467-16 469-16 471-16 473-16 475-16 477-16 479-16 481-16 483-16 485-16 487-16 489-16 491-16 493-16 495-16 497-16 499-16 501-16 503-16 505-16 507-16 509-16 511-16 513-16 515-16 517-16 519-16 521-16 523-16 525-16 527-16 529-16 531-16 533-16 535-16 537-16 539-16 541-16 543-16 545-16 547-16 549-16 551-16 553-16 555-16 557-16 559-16 561-16 563-16 565-16 567-16 569-16 571-16 573-16 575-16 577-16 579-16 581-16 583-16 585-16 587-16 589-16 591-16 593-16 595-16 597-16 599-16 601-16 603-16 605-16 607-16 609-16 611-16 613-16 615-16 617-16 619-16 621-16 623-16 625-16 627-16 629-16 631-16 633-16 635-16 637-16 639-16 641-16 643-16 645-16 647-16 649-16 651-16 653-16 655-16 657-16 659-16 661-16 663-16 665-16 667-16 669-16 671-16 673-16 675-16 677-16 679-16 681-16 683-16 685-16 687-16 689-16 691-16 693-16 695-16 697-16 699-16 701-16 703-16 705-16 707-16 709-16 711-16 713-16 715-16 717-16 719-16 721-16 723-16 725-16 727-16 729-16 731-16 733-16 735-16 737-16 739-16 741-16 743-16 745-16 747-16 749-16 751-16 753-16 755-16 757-16 759-16 761-16 763-16 765-16 767-16 769-16 771-16 773-16 775-16 777-16 779-16 781-16 783-16 785-16 787-16 789-16 791-16 793-16 795-16 797-16 799-16 801-16 803-16 805-16 807-16 809-16 811-16 813-16 815-16 817-16 819-16 821-16 823-16 825-16 827-16 829-16 831-16 833-16 835-16 837-16 839-16 841-16 843-16 845-16 847-16 849-16 851-16 853-16 855-16 857-16 859-16 861-16 863-16 865-16 867-16 869-16 871-16 873-16 875-16 877-16 879-16 881-16 883-16 885-16 887-16 889-16 891-16 893-16 895-16 897-16 899-16 901-16 903

Clamps—

R. L. Tool Co.'s Wrought Iron.....25¢
Adjustable, Cincinnati.....15¢10¢
Adjustable, Stearns.....10¢
Adjustable, Stearns.....30¢30¢10¢
Stearns' Adjustable Cabinet and Corner.....30¢30¢10¢
Cabinet, Sargent's.....60¢10¢
Carriage Makers', Sargent's.....70¢10¢
Eberhard Mfg. Co.'s.....40¢50¢40¢10¢
Parallel, C. H. Bealy & Co.'s.....25¢
Warner's.....40¢10¢40¢10¢
Saw Clamps, see Vices, Saw Filers'
Carpenters', Cincinnati.....25¢10¢

Cleaners.

Butchers'.
Bradley's.....25¢30¢
L. & J. White.....20¢25¢
Beatty's.....40¢40¢25¢
New Haven Edge Tool Co.'s.....40¢
P. S. & W. Co.'s.....35¢45¢35¢40¢
Foster Bros.....40¢40¢25¢
Schulte, Lohoff & Co.....40¢40¢25¢

Clips—

Norway, Axle, 1/4 & 5-16.....55¢25¢
2nd grade Norway Axle, 1/4 & 5-16.....65¢25¢
Superior Axle Clips.....66¢25¢70¢
Norway Spring Bar Clips, 5-16.....60¢25¢
Wrought-Iron Felice Clips.....7¢ 8¢ 6¢
Steel Felice Clips.....7¢ 8¢ 6¢
Baker Axle Clips.....25¢

Cloth and Netting, Wire—See Wire, &c.

Cockeyes.....50¢

Cocks, Brass.....60¢25¢

Coffee Mills—See Mills, Coffee.

Collars, Dog, &c.

Medford Fancy Goods Co.....40¢10¢
Embossed, Gift, Pope & Steven's Hat.....30¢10¢
Leather, Pope & Steven's Hat.....40¢
Brass, Pope & Steven's Hat.....40¢
Chapman Mfg. Company.....50¢10¢60¢

Combs, Curry.

Fitch's.....50¢10¢50¢10¢10¢
Rubber, per doz \$10.00.....30¢
Perfect.....50¢
Kellogg's.....50¢10¢
Sweet & Clark's.....50¢10¢

Compasses, Dividers, &c.—

Compasses, Callipers, Dividers, 70¢70¢10¢
Bemis & Call Co.'s.....80¢25¢
Dividers.....50¢25¢
Compasses & Callipers.....50¢25¢
Wing and Inside or Outside.....60¢
Double.....60¢
(Call's Pat. Inside).....30¢
Excelsior.....50¢
J. Stevens & Co.'s.....25¢10¢
Starrett's.....25¢10¢
Spring Callipers and Dividers.....25¢10¢
Lock Callipers and Dividers.....25¢
Combination Dividers.....25¢

Coopers' Tools—See Tools, Coopers'.

Cord—

Sash.
Common.....7¢ 10¢ @ 11¢
Patent, good quality.....7¢ 12¢ @ 12¢
White Cotton Braided, fair.....24¢40¢25¢
Common Russia Sash.....12¢10¢10¢
Patent Russia Sash.....7¢ 12¢ @ 12¢
Cable Laid Italian Sash.....21¢22¢
India Cable Laid Sash.....12¢
Silver Lace—
A Quality, White, 50¢.....25¢
A Quality, Drab, 55¢.....25¢
B Quality, White, 30¢.....10¢
E Quality, Drab, 35¢.....10¢
Sylvan Spring Extra Braided White, 34¢
Sylvan Spring, Extra Braided, Drab, 30¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....25¢
Massachusetts, White.....20¢
Samson—
Braided, White Cotton, 50¢.....30¢30¢25¢
Braided, Drab Cotton, 55¢.....30¢30¢25¢
Braided, Italian Hemp, 55¢.....30¢30¢25¢
Braided, Linen, 80¢.....30¢30¢25¢
Tate's Cotton Braided, White.....7¢ 8¢
Wire Picture.
Braided or Twisted.....75¢10¢
Corkscrews—See Screws, Cork.
Cork Knives and Cutters—See Knives, Cork.
Crackers, Nut—
Table (H. & B. Mfg. Co.).....40¢
Blake's Pattern.....40¢
Turner & Seymour Mfg. Co.....50¢
Cradles—
Grain.....50¢25¢30¢50¢10¢25¢
Oxways.
White Crayons, 7 gross.....10¢
D. M. Stewart Mfg. Co., Metal Work—
ers, 7 gr, \$2.50.....25¢
D. M. Stewart Mfg. Co., Rolling Mill,
7 gr, \$2.50.....25¢
See also Chalk.
Crow Bars—See Bars, Crow.
Curry Combs—See Combs, Curry.
Curtain Pins—See Pins, Curtain
Cutters—
Meat.
Dixon's 7 dos.....40¢25¢
Nos.....1 2 3 4 5 6 7 8 9 10
\$14.00 \$17.00 \$19.00 \$20.00
Woodruff's 7 dos.....40¢25¢
Nos.....100 150
\$15.00 \$18.00
Hales Pattern 7 dos.....70¢70¢25¢
Nos.....11 12 13
\$27.00 \$33.00 \$45.00
American.....30¢
Nos.....10 12 22 33 42
Each.....\$5 \$7 \$10 \$25 \$50 \$60 \$80
Enterprise.....30¢
Nos.....10 12 22 33 42
Each.....\$5 \$7 \$10 \$25 \$50 \$60 \$80
Great American Meat Cutters.....30¢
Nos.....115 116 117 118 119 120
Each.....\$1.00 \$2.75 \$3.00 \$3.50 \$4.00
Miller's Challenge 7 dos.....45¢45¢10¢
Nos.....1 2 3 4 5 6 7 8 9 10
\$22.00 \$30.00 \$40.00
Home No. 1.....7 dos, \$26.00, \$45¢10¢

Draw Cut, each:
Nos.....1 2 3 4 5 6 7 8
\$50 \$75 \$80 \$225.....20¢25¢
Great American.....30¢
Beef Shavers (Enterprise).....30¢10¢40¢
Little Giant.....50¢
Chadborn's Smoked Beef Cutter, 7 dos.....\$68.00

Tobacco.

Champion.....20¢10¢30¢
Wood Bottom.....7 dos \$5.00 \$5.25
All Iron.....7 dos \$4.25
Nashua Lock Co.'s.....7 dos, \$18.00 50¢55¢
Wilson's.....50¢
Sargent's.....7 dos, \$24, 55¢10¢
Acme.....7 dos \$20.00, 40¢

Washer.

Smith's Pat.....7 dos \$12.00, 20¢10¢10¢
Johnson's.....7 dos \$11.00, 33¢
Penny's 7 dos Pol. \$14; Jap'd, \$16.00, 55¢
Appleton's.....7 dos \$16.00, 60¢10¢
Bonney's.....7 dos.....30¢10¢
Cincinnati.....25¢10¢

Dampers, &c—

Dampers, Buffalo.....40¢10¢
Buffalo Dampers Clips.....40¢10¢
Crown Damper.....40¢
Excelsior.....40¢10¢

Diggers, Post Hole, &c.—

Samson Post Hole Digger, 7 dos \$36.00.....25¢
Fletcher Post Hole Augers, 7 dos \$36, 20¢
Eureka Diggers.....7 dos \$12.50 \$14.00
Lead's.....7 dos \$8.00 \$9.00
Vaughan's Post Hole Auger, 7 dos.....\$13.00 \$14.00
Kohler's Little Giant.....7 dos, \$18.00
Kohler's Hercules.....7 dos, 15.00
Kohler's New Champion.....7 dos, \$9.00
Schneider.....7 dos, \$18.00
Ryan's Post Hole Diggers.....7 dos \$24.00
Cronk's Post Bars, 7 dos \$60.00.....50¢50¢10¢
Gibbs Post Hole Digger, 7 dos \$90.00, 50¢
Imperial.....7 dos \$15.....45¢

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.

Door Springs—See Springs, Door.

Drawers.

Money, 7 dos.....\$18¢20¢

Drawing Knives—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmith's.....each \$1.75
Blacksmith's Self-Feeding, each \$7.50, 30¢
Brest, P. S. & W.....40¢10¢
Brest, Wilson's.....30¢25¢
Brest, Miller's Falls.....each \$5.00, 25¢
Brest, Bartholomew's.....each \$2.50, 25¢10¢40¢
Ratchet, Merrill's.....20¢20¢25¢
Ratchet, Ingersoll's.....25¢
Ratchet, Parker's.....30¢20¢
Ratchet, Whitney's.....20¢10¢
Ratchet, Weston's.....20¢25¢
Ratchet, Moore's Triple Action.....25¢30¢
Ratchet, Curtis & Curtis.....30¢
Whitney's Hand Drill, Plain, \$11.00;
Adjustable, \$12.00.....20¢10¢
Wilson's Drill Stocks.....\$1.75 \$1.85
Twist Drills—
Morse.....50¢10¢25¢
Standard.....50¢10¢25¢
Syracuse (Metal list).....50¢10¢25¢
Cleveland.....50¢10¢25¢
William.....50¢10¢10¢
New Process.....50¢10¢25¢
Graham's Pat. Groove Shank 50¢10¢25¢

Drill Bits—See Augers and Bits.

Drill Chucks—See Chucks.

Dripping Pans—See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.....20¢30¢10¢
Dixons.....60¢
Buck Bros.....30¢
Stanley R. & L. Co.'s
Varnished Handles.....65¢10¢
Black Handles.....60¢10¢
Sargent & Co.'s
No. 1 Forged Blade.....60¢10¢10¢
Nos. 20, 30 and 60.....60¢10¢10¢
P. S. & W.....70¢
Knapp & Cowles:
No. 1.....60¢10¢70¢
No. 2.....60¢10¢10¢70¢25¢
No. 3.....60¢10¢10¢10¢
Nos. 4 and 60, Acme and Ideal.....50¢
Stearns'.....25¢10¢25¢
Gay & Parsons.....35¢
Champion.....25¢10¢
Clark's Pat.....30¢30¢45¢
Crawford's Adjustable.....30¢
Allard's Spiral, new list.....25¢
Koll's Common Sense 7 dos \$6.00, 25¢10¢
Syracuse Screw-Driver Bits.....30¢30¢25¢
Screw-Driver Bits.....7 dos, 50¢75¢
Screw-Driver Bits, Parr's.....7 gr 30-25
Fray's Hol. Hdle. Sets, No. 3, \$12.00, 25¢
P. D. & Co.'s all Steel.....25¢25¢10¢
Cincinnati.....25¢10¢
Brace Screw Drivers.....25¢10¢
Buck Bros' Screw-Driver Bits.....

Egg Beaters—See Beaters, Egg.

Egg Poachers—See Poachers, Egg.

Electric Bell Sets—See Bells, Electric.

Emery.—No. 4 to No. 54 to Flour, C.F.
46 gr. 150 gr. F.F.
Kogs, 7 dos.....\$ 5 8 24¢
Kogs, 7 dos.....\$ 5 8 24¢
Kogs, 7 dos.....\$ 5 8 24¢
10-b cans, 10.....6¢ 5¢
In case.....6¢ 5¢
10-b cans, less than 10.....10¢ 7 1/2¢

Enamelled and Tinned Ware—
See Ware, Hollow.

Escutcheon Pins—See Pins, Escutcheon.

Escutcheons.

Door Lock.....Same dis as Door Locks.
Brass Thread.....60¢60¢10¢
Wood.....25¢

Expanded Metal.

List No. 5.
Lathing.....10¢
Fencing, Painted Sheets.....20¢
Netting, Painted Sheets.....20¢
Door Mats, Galvanized.....25¢
Window Guards, Paneled.....15¢
Tree Guards, Paneled.....15¢

Extractors, Lemon Juice—See Squeezers, Lemon.

Fasteners, Blind—

Mackrell's, 7 dos, \$1.00.....20¢20¢10¢
Van Sand's Screw Pat., \$15 gr.....60¢10¢
Van Sand's Old Pat., \$15.00 gr.....55¢10¢
Washburn's Old Pattern, 7 gr.....\$9.00
Merriman's.....new list
Austin & Eddy No. 2006 gr.....\$4.00
Security Gravity, 7 gr.....\$9.00

Faucets.—

Fenn's.....40¢
Bohren's Pat. Rubber Ball.....25¢
Fenn's Cork Stops.....35¢
Star.....60¢
Frary's Pat. Petroleum.....40¢25¢25¢
B. & L. B. Co.
West's Lock, Open and Shut Key.....50¢
Star, Metal Plug, new list.....40¢
Lockport, Metal Plug, reduced list.....60¢
Metallic Key, Leather Lined.....60¢10¢
Cork Lined.....70¢50¢70¢10¢
Burnside's Red Cedar, bbl lots.....50¢10¢
John Sommers'
Peerless Best Block Tin Key.....40¢
LXL, 1st quality, Cork Lined.....50¢
Diamond Lock.....40¢
Perfection, Fla. Red Cedar.....50¢
Goodenough Cedar.....50¢
Boss Metallic Key.....50¢
Reliable Cork Lined.....60¢
Western Pattern Cork Lined.....50¢
Self-Measuring
Enterprise, 7 dos \$50.00.....30¢10¢
Lane's, 7 dos \$32.00.....25¢10¢
Victor, 7 dos \$36.00.....25¢10¢

Felice Plates—See Plates, Felice.

Fifth Wheels.—

Derby and Cincinnati.....45¢25¢
Brewster.....50¢25¢

Files—

Domestic—
Nicholson Files, Rasps, &c.....60¢10¢60¢10¢25¢
Nicholson (X. F.) Files.....25¢
Nicholson's Royal Files (Seconds).....75¢
(extra prices on certain sizes)
G. & H. Barnett (Black Diamond).....50¢10¢60¢10¢25¢
Eagle.....60¢10¢50¢10¢10¢
Other makers, best brands.....60¢10¢60¢20¢
Fair brands.....60¢10¢10¢70¢25¢
Second quality.....70¢10¢75¢10¢
Heller's Horse Rasps.....50¢75¢60¢10¢
McCaffrey's Horse Rasps.....50¢10¢
Chelsea Horse Rasps, Hand Cut.....50¢10¢
Imported—
Gambie.....List, April 1, 1883, 15¢
Butcher.....Butcher's list, 20¢
Stubbs.....Stubbs list, 25¢30¢
Turton's.....Turton's list, 20¢25¢
Greaves' Horse Rasps, American list, 60¢

Fixtures.

Grindstone—
Sargent's Patent.....70¢10¢
Reading Hardware Co.....80¢10¢
P. S. & W. Co.....50¢10¢

Fluting Machines—See Machines, Fluting.

Fluting Scissors—See Scissors, Fluting.

Fodder Squeezers—See Squeezers, Fodder.

Forks—

Hay, Manure, &c., Asso List, 65¢50¢65¢10¢
Hay, Manure, &c., Phila. List, 60¢60¢25¢
Plated, see Spoons.

Frames—

Saw—
White Vermont.....7 gr 30.00 \$10.00
Red, Polished and Varnished.....7 dos \$1.50, 25¢

Screens, Window and Door—

Porter's Pat. Window and Door Frame.....33¢25¢10¢
Warner's Screen Corner Irons.....35¢40¢
Stearns' Frames and Corners.....35¢25¢10¢
Cortland.....40¢40¢25¢

Freezers, Ice Cream—

White Mountain.....60¢60¢25¢
Granite State.....65¢65¢25¢
Arctic.....70¢70¢25¢
American.....60¢
Shenard's Lightning.....65¢65¢25¢
Gem.....65¢
Blizzard.....70¢
Double Action Crown.....60¢
Star.....60¢
Peerless.....60¢10¢
Giant.....60¢
Zero.....60¢10¢10¢
Boss and Pet.....60¢10¢10¢10¢
Keystone, P. D. & Co., each, \$1.50.....30¢

Fruit and Jelly Presses—See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Funnels.

Gersdorff's Perfection, Standard and Globe; 7 1/2, 1 gr, 10 gr, 3 to 5 gr, 20 to 5 to 10 gr.....30¢
Copper, 1 to 6 dos, 15 gr; 6 to 15 dos, 20 gr; over 15 dos.....25¢

Furnaces, Soldering.

Burgess No. 3 Gem, tin reservoir.....\$7.00
Burgess No. 3 Gem, copper reservoir, 8.50

Fuse—

Common Hemp Fuse, for dry ground, \$2.70
Common Cotton Fuse, for dry ground, 2.35
Single Taped Fuse, for wet ground, 3.35
Double Taped Fuse, for very wet gr. 4.35
Triple Taped Fuse, for very wet gr. 5.50
Small Gutta Percha Fuse, for water, 7.50
Large Gutta Percha Fuse, for water, 14.00

Gates, Molasses—

Stebbin's Pattern.....75¢10¢50¢80¢
Stebbin's Genuine.....60¢10¢10¢
Stebbin's Tinned Ends.....40¢10¢
Chase's Hard Metal.....50¢10¢
Bush's.....30¢
Lincoln's Pattern.....70¢70¢10¢
Weed's.....30¢10¢
Boss, 7 dos:
No. 1, \$7; No. 2, \$8; No. 3, \$9; No. 4, \$10.....60¢10¢10¢

Gauges.

Marking, Mortise, &c.....60¢10¢
Starr's Surface, Center and Scratch.....25¢10¢
Wire, low list.....10¢10¢
Wire, Wheeler, Madden & Co.....10¢
Wire, Morse's.....25¢
Wire, Brown & Sharpe's.....10¢10¢
Wire, P. S. & W. Co.....10¢10¢

Gimlets—

Nail and Spike.....50¢10¢25¢
"Eureka" Gimlets.....40¢10¢
"Diamond" Gimlets.....7 gr \$5.00
Double Cut, Shepardson's.....45¢45¢25¢
Double Cut, Ives'.....60¢60¢25¢
Double Cut, Douglass'.....60¢10¢
"Bee," 7 gr \$13.....25¢35¢25¢

Glue—

La Page's Liquid.....25¢25¢25¢
Upton's Liquid.....25¢
Improved Process.....25¢25¢25¢

Glue Pots—See Pots, Glue.

Grease, Axle.

Fraser's.....Keg 7 1/2 49, Pall 7 1/2 59
Fraser's, in boxes.....7 gr \$0.50
Dixon's Everlasting, in bxs.....\$1.20; 2 1/2 \$2.00
Dixon's Everlasting.....10-b pails, ea. 25¢
Lower grades, special brands.....7 gr \$5.50 \$7.00

Grindstones—

Small, at factory.....1 ton \$7.50 \$2.00
Family, Cleveland Stone Co.....20¢
Grindstone Fixtures—See Fixtures, Grindstone.

Hack Saws—See Saws.

Hafte, Awl.

Sewing, Brass Fer, 7 gr, \$3.50.....45¢10¢
Pat. Sewing, Short, \$1.00 7 dos.....40¢10¢
Pat. Sewing, Long.....7 dos \$1.80
Pat. Peg, Plain Top, 7 gr \$10.00.....45¢10¢
Pat. Peg, Leather Top, 7 gr \$12.00, 45¢10¢

Halters.

Covert's, Rope, Jute.....6 1/2 10¢10¢25¢
Covert's, Rope, 7-16 in., Jute.....70¢25¢
Covert's, Rope, 1/4 in. Hemp.....60¢25¢
Covert's Adj. Rope Halters.....40¢25¢
Covert's Hemp Horse and Cattle Tie.....50¢25¢

Covert's Jute Horse Ties.....70¢25¢
Covert's Jute Cattle Tie.....70¢10¢25¢
Covert's Adj. Web Halters.....35¢25¢25¢

Hammers—

Handled Hammers—
Maydole's, list Dec. 1, '85.....25¢10¢35¢
Buffalo Hammer Co.....
Rumason & Beckley.....50¢50¢10¢
Asha Tool Co.....
C. Hammond & Son.....
Verree.....
Fayette R. Plumb.....
"Artisan's Choice," A. E. Nail 40¢12¢1/4
Regul-F Y. & P. "A. E. Nail.....50¢
Hornshoe Turning Hammer.....50¢
Other Hammers.....50¢10¢
Hartford, Nail Hammers.....40¢25¢
Hartford, Machinists, &c.....50¢50¢60¢10¢
Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 & 1.75.....30¢10¢
Nelson Tool Works.....40¢10¢
Warner & Schott.....30¢25¢
Peck, Stow & Wilcox.....40¢
Sargent's.....35¢10¢
Heavy Hammers and Sledges—
3 1/2 and under.....7 1/2 40¢
3 to 5.....7 1/2 35¢; 70¢70¢10¢
Over 5.....7 1/2 30¢
Wilkinson's Smiths.....10¢40¢11¢7 1/2

Handcuffs and Leg Irons—See Police Goods.

Handles—

Cross-Cut Saw Handles—
Atkins' No. 1 Loop, 7 pair, 25¢; No. 3 13¢; No. 6, 16¢; No. 2 and No. 4 Reversible, 18¢.
Boynton's Loop Saw Handles, 50¢.....60¢
Champion.....15¢

Iron, Wrought or Cast—

Door or Thumb.

Nos.....0 2 3
Per doz.....\$0.50 1 lb 1.15 1.35 1.50
60¢10¢10¢
Joggins' Latches.....7 dos 30¢30¢30¢
Bronze Iron Drop Latches.....7 dos 70¢ net
Pate's Store Door Handles—Nuts, \$1.63;
Plate, \$1.10; no Plate, \$0.83.....net
Sarn Door, 7 dos \$1.40.....10¢10¢
Rest and Lifting.....70¢

Wood—

Jaw and Plane.....40¢10¢40¢10¢25¢
Hammer, Hatchet, Axe, Sledge, &c.....40¢
Grad Awl.....7 gr \$2.00
Hickory Firmer Chisel, ass'd.....7 gr 4.50
Hickory Firmer Chisel, large.....7 gr 5.00
Apple Firmer Chisel, ass'd.....7 gr 5.00
Apple Firmer Chisel, large.....7 gr 6.00
Socket Firmer Chisel, ass'd.....7 gr 8.00
Socket Framing Chisel, ass'd.....7 gr 5.00
J. S. Smith & Co.'s Pat File.....60¢
File, assorted.....7 gr 7.75
Auger, assorted.....7 gr 5.00.....50¢
Auger, 7 gr 7.00.....30¢10¢
Pat. Auger, 7 gr.....30¢10¢
Pat. Auger, Douglass.....7 gr \$1.25
Pat. Auger, Swan's.....7 gr \$1.00
Hoe, Rake, Shovel, &c.....60¢10¢

Hack Saws—

Griffin's, complete, 40¢10¢50¢
 Griffin's Hack Saw, Blades, 40¢10¢50¢
 Star Hack Saws and Blades, 25¢
 Eureka and Crescent, 25¢

Scroll—

Lester, complete, \$10.00, 25¢
 Rogers, complete, \$4.00, 25¢
 Barnes' Builders' and Cabinet Makers'
 \$15, 25¢
 Barnes' Scroll Saw Blades, 25¢

Saw Frames—See Frames, Saw.**Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality, \$5.00
 Hatch, Tea, No. 161, \$5.75 to \$7.00
 Union Platform, Plain, \$2.10 to \$2.20
 Union Platform, Striped, \$2.40 to \$2.50
 Chaffin's Grocers' Trip Scales, 50¢
 Chaffin's Eureka, 25¢
 Chaffin's Favorite, 40¢
 Family Turnbills, 50¢ to 60¢
 Ritchie Bros., Platform, 40¢

Scale Beams—See Beams, Scale.**Scissors, Fluting—**

Scissors, Fluting, 45¢

Scrapers—

Adjustable Box Scraper (S. R. & L. Co.)
 \$5.50, 80¢10¢
 Box, 1 Handle, \$5.00, 10¢
 Box, 2 Handle, \$5.00, 10¢
 Defiance Box and Ship, 20¢10¢
 Foot, 60¢10¢ to 60¢
 Ship, Common, \$5.50 to \$5.00
 Ship, R. I. Tool Co., 10¢

Screen Window and Door**Frames—See Frames.****Screw Drivers—See Drivers, Screw.****Screws.****Beach and Hand—**

Bench, Iron, 55¢10¢55¢10¢10¢
 Bench, Wood, Beech, \$5.00 to \$5.25
 Bench, Wood, Hickory, 30¢10¢
 Band, Wood, 30¢10¢ to 30¢10¢
 Lag, Blunt Point, Hist Jan. 1, 1890, 75¢10¢
 Coach and Lag, Blunt Point, Hist Jan. 1, 1890, 75¢10¢
 Red, 25¢5¢
 Hand Rail, Sargent's, 60¢10¢
 Hand Rail, H. & J. Mfg. Co., 70¢10¢ to 75¢
 Hand Rail, Am. Screw Co., 60¢10¢
 Jack Screws, Millers Falls Hist., 50¢10¢
 Jack Screws, P. S. & W., 35¢
 Jack Screws, Sargent's, 60¢10¢ to 60¢10¢
 Jack Screws, Stearns, 40¢10¢ to 40¢10¢

Cork—

Humason & Beckley Mfg. Co., 40¢10¢ to 50¢
 Williamson's, 35¢ to 35¢
 Howe Bros. & Hulbert, 35¢

Machine—

Flat Head, Iron, 55¢
 Round Head, Iron, 60¢

Wood—

List January 1, 1891.
 Flat Head Iron, 72¢4¢
 Round Head Iron, 73¢4¢
 Flat Head Brass, 73¢4¢
 Round Head Brass, 65¢
 Flat Head Bronze, 72¢4¢
 Round Head Bronze, 65¢
 Rogers' Drive Screws, 83¢4¢

Scroll Saws—See Saws, Scroll.**Scythes.**

Grain, 40¢5¢ to 40¢5¢ to 40¢5¢
 Grass, 40¢10¢ to 40¢5¢

Scythe Snaths—See Snaths, Scythe**Set.****Awl and Tool.**

Alken's Sets, Awls and Tools, No. 20, \$5.00, 55¢10¢
 Fray's Adj. Tool Hdl., Nos. 1, 12, 3, 18, \$1.25, 4, 50¢
 Miller's Falls Adj. Tool Hdl., No. 1, \$1.25, 4, 50¢
 Henry's Combination Haft, \$5.00 to \$5.50
 Brad Sets, No. 42, \$10.50; No. 43, \$12.50; 70¢10¢ to 5¢
 Stanley's Excelsior, No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50, 30¢10¢
 Nail—

Square, \$4.00 to \$4.25
 Round, \$3.25 to \$3.50
 Buck Bros., 27¢4¢
 Cannon's Diamond Point, \$7.12, 20¢

Rivet.

Regular list, 50¢10¢

Saw—

Stillman's Genuine, \$5.00 to \$7.75
 Stillman's Imita., \$5.25 to \$5.25
 Common Lever, \$5.00 to \$5.00
 Morrill's No. 1, \$15.00; No. 2, \$24.00, 40¢10¢ to 5¢

Letch's, No. 0, \$3.00; No. 1, \$15, 15¢ to 20¢
 Nash's, 30¢10¢ to 30¢10¢
 Hammer, Hotchkiss, \$5.00, 10¢
 Hammer, Bemis & Call Co.'s new Pat., 80¢5¢

Bemis & Call Co.'s Lever and Spring Hammer, 30¢5¢
 Bemis & Call Co.'s Plate, 10¢
 Bemis & Call Co.'s Cross Cut, 12¢4¢
 Aiken's Genuine, \$12.00, 50¢10¢
 Hart's Pat. Lever, 20¢
 Dieston's Star, 25¢
 Leopold, 40¢10¢ to 50¢
 Atkin's Lever, \$5.00 to \$1.00, 40¢
 Atkin's Criterion, \$5.00 to \$1.00, 40¢
 Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00, 40¢10¢
 Avery's Saw Set and Punch, 50¢
 Chieftain H. R. Co.'s Superior, \$5.00 to \$15, 50¢
 Crescent, \$5.00 to \$3.00

Sharpeners, Knife.

Parkins, Applewood Handles, \$5.00 to \$6.00, 40¢
 Rosewood or Cocobolo, \$5.00 to \$6.00, 40¢

Shaves, Spoke.

Iron, 45¢
 Wood, 30¢
 Bailey's (Stanley R. & L. Co.), 40¢10¢
 Stearns, 30¢10¢
 Cincinnati, 35¢10¢
 Goodell's, \$5.00 to \$5.00, 25¢

Shears—

American (Cast) Iron, 75¢10¢ to 75¢10¢ to 5¢
 Barnard's Lamp Trimmers, \$5.00 to \$3.75
 Tinnars, 20¢2¢
 Seymour's, List, Dec. 1891, 60¢10¢ to 60¢10¢ to 5¢

Heinrich's, List, Dec. 1891, 60¢10¢ to 60¢10¢ to 5¢
 Heinrich's Tailor's Shears, 83¢4¢
 Cast Steel Trimmers, 80¢10¢ to 80¢10¢ to 10¢

First quality, 80¢10¢ to 80¢10¢ to 10¢
 Second quality, 80¢10¢ to 80¢10¢ to 10¢
 Acme Cast Shears, 10¢10¢
 Diamond Cast Shears, 10¢10¢
 Victor Cast Shears, 75¢10¢ to 75¢10¢ to 5¢

Howe Bros. & Hulbert, Solid Forged Steel, 40¢
 Chicago Drop Forge & F. Co., Solid Steel Forged, 60¢
 Davenport Cutlery Co., 60¢ to 60¢10¢
 Clausen Shear Co., Japanned, 70¢
 Clausen Shear Co., Nickel, same list, 50¢
 Galvanic, 3/4 to 1 in, \$5.00, \$1.00, \$1.00

Pruning Shears and Hooks.

Diaston's Combined Pruning Hook and Saw, \$5.00 to \$15.00, 20¢10¢
 Diaston's Pruning Hook, \$5.00 to \$15.00, 20¢10¢
 E. S. Lee & Co.'s Pruning Tools, 40¢
 Pruning Shears, Henry's Pat., \$5.00 to \$3.75, 4.00
 Henry's Pruning Shears, \$5.00 to \$4.25, 4.50

Wheeler, M. & C. Co.'s Combination, 80¢
 Dunlap's Saw and Chisel, \$5.00 to \$5.00, 30¢
 J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25
 P. S. & W. Co., 60¢

Tinners', etc.—

Shears and Snips (P. S. & W.), 30¢ to 25¢
 Snips, J. Mallinson & Co., 35¢4¢

Sheaves—**Sliding Door—**

M. W. Co., List July, 1888, 50¢10¢ to 60¢5¢
 R. & E., List Dec. 18, 1885, 55¢20¢
 Corbin's List, 60¢10¢ to 60¢10¢
 Patent Roller, 60¢10¢ to 60¢10¢
 Patent Roller, Hatfield's, 75¢
 Russell's Anti-Friction, List Dec. 18, 1885, 60¢2¢
 Moore's Anti-Friction, 60¢

Sliding Shutter—

R. & E. List Dec. 18, 1885, 60¢10¢ to 60¢10¢
 Reading list, 60¢10¢ to 60¢10¢

Shells—

First quality 4, 8, 10 and 12 gauge, 25¢10¢ to 25¢10¢
 First quality, 14, 16 and 20 gauge (\$10 list), 30¢10¢ to 30¢10¢
 Rise, 40¢2¢
 Star, Club, Rival and Climax brands, 35¢4¢ to 35¢4¢

Belbold's Comb. Shot Shells, 15¢2¢
 Brass Shot Shells, 1st quality, 60¢5¢
 Brass Shot Shells, Club, Rival, Climax, 60¢5¢

Shells Loaded—

standard List, July 19, 1890, 40¢10¢ to 40¢10¢

Ship Tools—

L. & J. J. White, 30¢2¢

Shoes, Horse, Mule, &c.—**Horse—**

Burden's, Perkins', Phoenix and Bryden's Boss, at factory, \$4.00
 Bryden's Frog Pressure, at factory, \$5.00

Mule—

Add \$1 per keg to above prices.

Oz. Wrought—

Ten lots, \$5.00 to \$5.00, 5¢
 1000 lb. lots, \$5.00 to \$5.00, 5¢
 See 5 lb. lots, \$5.00 to \$5.00, 5¢

Shot—

Drop, up to BB, 25-b bag, \$1.41
 Drop, up to BB, 5-b bag, .35
 Drop, BB and larger, 25-b bag, 1.67
 Drop, BB and larger 5-b bag, .40
 Buck and Chilled, 25-b bag, 1.67
 Buck and Chilled, 5-b bag, .40
 Dust Shot, 25-b bag, 2.00
 Dust Shot, 5-b bag, .45

Shovels and Spades—

Ames' Shovels, Spades, etc., List Nov. 1, 1885, 30¢
 Note.—Jobbers frequently give 5¢ to 7¢ extra on above.

Griffith's Black Iron, 50¢10¢
 Griffith's C. S., 60¢10¢ to 60¢10¢
 Griffith's Solid C. S. R. R. Goods, 20¢
 St. Louis Shovel Co., 30¢10¢ to 30¢10¢
 Hussey, Binns & Co., 15¢2¢
 Hubbard & Co., 30¢10¢ to 30¢10¢
 Lehigh Mfg. Co., 60¢10¢
 H. M. Myers Co., 30¢
 Payne Pettebone & Son, 35¢4¢
 Remington's (Lowman's) Pat., 80¢10¢ to 80¢10¢
 Rowland's, Black Iron, 60¢10¢
 Rowland's Steel, 60¢10¢ to 60¢10¢

Shovels and Tongs—

Iron Head, 60¢10¢ to 60¢10¢ to 5¢
 Brass Head, 60¢10¢ to 60¢10¢ to 5¢

Sieves—

Mann's Tin Rim, 60¢2¢
 Buffalo Metallic, S. S. & Co., 50¢2¢
 Shaker (Barber's Pat.) Flour Sifters, \$5.00 to \$5.00, \$21.00
 Electric, \$5.00 to \$5.00, \$21.00
 A. & W. Sifters, \$5.00 to \$5.00, \$21.00
 Hunter's, \$5.00 to \$5.00, \$21.00
 Smith's Adjustable Sifter, \$5.00 to \$5.00, \$21.00
 Smith's Adjustable Milk Strainer, \$5.00 to \$5.00, \$21.00
 Smith's Adjustable T. & C. Strainer, \$5.00 to \$5.00, \$21.00

Sieves, Wooden Rim—

Mesh 18, Nested, Iron, Plated, \$5.00 to \$5.00, \$1.00
 Mesh 20, Nested, \$5.00 to \$5.00, \$1.00
 Mesh 24, Nested, \$5.00 to \$5.00, \$1.15

Skins, Thimble—

Western list, 75¢5¢ to 75¢10¢
 Columbus Wrt. Steel, Special net price, 60¢
 Coldbrookdale Iron Co., 60¢
 Seneca Falls Pattern, 60¢
 Utica P. & T. Skins, 60¢
 Utica Turned and Fitted, 35¢

Slates—

School, by case, 50¢10¢ to 50¢10¢ to 10¢

Snaps, harness, &c.—

Anchor (T. & S. Mfg. Co.), 65¢
 Fitch's (Bristol), 50¢10¢
 Hotchkiss, 10¢
 Andrews, 50¢
 Sargent's Patent Guarded, 70¢10¢ to 70¢10¢
 German, new list, 40¢10¢
 Covert, 50¢10¢ to 50¢10¢ to 2¢
 Covert, New Patent, 60¢10¢ to 60¢10¢ to 2¢
 Covert, New R. E., 60¢10¢ to 60¢10¢ to 2¢
 Covert, Spring, 60¢10¢ to 60¢10¢ to 2¢

Snaths, Scythe.

List, 80¢. \$

Soldering Irons—See Irons, Soldering.**Spittoons, Cuspidors, &c.**

Standard Fiberglass—
 Cuspidors, 8 1/2-inch, \$5.00, No. 5, \$8;
 No. 6, \$9.
 Spittoons, Daisy, 8-inch, No. 1, \$4; 10 and 11 inch, \$6.

Spoke Shaves—See Shaves, Spoke.**Spoke Trimmers—See Trimmers, Spoke.****Spoons and Forks—**

Tinned Iron—
 Basting, Can. Stamp. Co.'s list, 70¢10¢
 Solid Table and Tea, Can. Stamp. Co.'s list, 70¢10¢
 Buffalo S. S. & Co., 38¢4¢ to 38¢4¢
 Silver-Plated—(4 mos. or 5¢ cash 30 days)

Meriden Brit. Co., Rogers, 40¢15¢
 C. Rogers & Bros., 40¢15¢
 Rogers & Bros., 40¢15¢
 Reed & Barton, 40¢15¢
 Wm. Rogers Mfg. Co., 40, 15¢5¢
 Simpson, Hall, Miller & Co., 40, 15¢5¢
 Roines & Edwards Silver Co., 40, 15¢5¢
 L. Boardman & Son, 50¢13¢4¢

Miscellaneous.

Holmes & Edwards Silver Co.:
 No. 67 Mexican Silver, 50¢10¢ to 50¢10¢ to 5¢
 No. 80 Silver Metal, 50¢10¢ to 50¢10¢ to 5¢
 No. 24 German Silver, 50¢10¢ to 50¢10¢ to 5¢
 No. 50 Nickel Silver, 50¢10¢ to 50¢10¢ to 5¢
 No. 49 Nickel Silver, 50¢10¢ to 50¢10¢ to 5¢
 Wm. Rogers Mfg. Co., 50, 10¢2¢
 125 Rogers' German Silver, 60¢2¢
 235 Rogers' Nickel Silver, 60¢2¢
 German Silver, 50¢5¢ to 50¢5¢ to cash
 German Silver, Hall & Elton, 50¢5¢ to cash
 Nickel Silver, 50¢5¢ to 50¢5¢ to cash
 Britannia, 50¢10¢ to 50¢10¢ to 5¢
 Boardman's, 50¢10¢ to 50¢10¢ to 5¢
 Boardman's Britannia Spoons, case lots, 60¢5¢ to cash

Springs—**Door—**

Torrey's Rod, regular size, \$5.00 to \$1.80
 Gray, \$5.00 to \$5.00, 30¢
 See Rod, \$5.00 to \$5.00, 30¢
 Warner's No. 1, \$5.00 to \$5.00, 30¢
 \$3.80, 40¢10¢ to 40¢10¢
 Gem (Coll), List April 19, 1886, 10¢
 Star (Coll), List April 19, 1886, 20¢
 Victor (Coll), 60¢10¢ to 60¢10¢ to 10¢
 Champion (Coll), 60¢10¢ to 60¢10¢ to 10¢
 Philadelphia, 5 in, \$5.00; 8 in, \$7.75;
 Cowell's, No. 1, \$5.00 to \$5.00, 30¢
 \$15.00, 50¢
 Rubber, complete, \$5.00 to \$5.00, 50¢
 Hercules, 50¢
 Shaw Door Check and Spring, 35¢10¢ to 35¢10¢ to 30¢

Carriage, Wagon, &c.—

Killip, Concord, Platform and Bail
 Scroll, 60¢10¢ to 60¢10¢ to 10¢
 Cliff's Bolster Springs, 25¢

Squares—

Steel and Iron, \$5.00 to \$5.00 to 10¢
 Nickel-Plated, 60¢10¢ to 60¢10¢ to 10¢
 Try Square and T Bevels, 60¢10¢ to 60¢10¢ to 10¢
 Diaston's Try Square and T Bevels, 50¢
 Winterbottom's Try and Miter, 30¢10¢
 Starrett's Micrometer Caliper Squares, 25¢

Avery's Flush Bevel Squares, 40¢
 Avery's Bevel Protractor, 60¢
 Squeezers—

Folder—

Blair's, \$5.00 to \$5.00, \$22.00
 Blair's "Climax", \$5.00 to \$5.00, \$22.00

Lemon—

Porcelain Lined, No. 1, \$5.00 to \$5.00, 50¢30¢
 Wood, No. 2, \$5.00 to \$5.00, 35¢
 Wood, Common, \$5.00 to \$5.00, 17¢
 Dunlap's Improved, \$5.00 to \$5.00, 20¢
 Sammis, No. 1, \$5.00; No. 2, \$4.00, 12¢
 \$18, \$5.00, 25¢10¢
 Jennings' Star, \$5.00 to \$5.00, \$23.00
 The Boss, \$5.00 to \$5.00, \$23.00
 Leath's, No. 1, \$5.00 to \$5.00, \$23.35; 2, \$1.90; Queen, \$2.50
 Little Giant, 60¢5¢ to 60¢5¢ to 5¢
 King, 40¢5¢
 Hotchkiss Straight Flush, \$5.00 to \$5.00, \$12.00
 Silver & Co. Glass, \$5.00 to \$5.00, \$10.00
 Manny Lemon Juice Extractor, Standard, \$5.00 to \$5.00, \$11.00
 Improved, \$5.00 to \$5.00, \$11.00

Standard Fiber Ware—See Ware, Standard Fiber.**Staples.**

Blind—
 Barbed, 3 in. and larger, \$5.00 to \$5.00, \$7.75
 Barbed, 3 in., \$5.00 to \$5.00, \$7.75
 Fence Staples, Galvanized, same price as Barbed
 Fence Staples, Plain, \$5.00 to \$5.00, \$7.75
 See Trd. Rep.

Steelyards—

40¢10¢ to 40¢10¢ to 5¢

Stocks and Dies—

Blacksmith's
 Waterford Goods, 40¢4¢10¢
 Butterfield's Goods, 40¢4¢10¢
 Lightning Screw Plate, 25¢30¢
 Beece's New Screw Plates, 35¢4¢5¢ to 40¢
 Reversible Ratchet, 30¢
 Gardner, 25¢

Stops, Bench.

Morrill's, \$5.00 to \$5.00, 50¢
 Hotchkiss's, \$5.00 to \$5.00, 50¢
 Weston's, No. 1, \$10; No. 2, \$5.00 to 10¢10¢
 McGill's, \$5.00 to \$5.00, 10¢
 Cincinnati, 35¢10¢

Stone—

Hindustan No. 1, 8¢; Axe, 3 1/2¢; Slips
 No. 1, 4 1/2¢
 Sand Stone, \$5.00 to \$5.00, 2¢4¢
 Washita Stone, Extra, \$5.00 to \$5.00, 2¢4¢
 Washita Stone, No. 1, \$5.00 to \$5.00, 2¢4¢
 Washita Stone, No. 2, \$5.00 to \$5.00, 2¢4¢
 Washita Slips, No. 1, Extra, \$5.00 to \$5.00, 4¢4¢
 Washita Slips, No. 1, \$5.00 to \$5.00, 3¢3¢
 Arkansas Stone, No. 1, 4 to 6 in, \$1.50
 Arkansas Stone, No. 2, 4 to 9 in, \$1.85
 Turkey Oil Stone, 4 to 8 in, \$5.00
 Turkey Slips, \$5.00 to \$1.00, 1.50
 Lake Superior, Chase, \$5.00 to \$5.00, 20¢
 Seneca Stone, Red Paper Brand, \$5.00 to \$5.00, 18¢20¢

Seneca Stone, High Rounds, \$5.00 to \$5.00, 25¢
 Seneca Stone, Small Whets, \$5.00 to \$5.00, 25¢

Steve Polish—See Polish, Stove.**Stretchers, Carpet.**

Cast Steel, Polished, \$5.00 to \$5.00, 35¢
 Cast Iron, Steel Points, \$5.00 to \$5.00, 35¢
 Socket, \$5.00 to \$5.00, 35¢
 Jullard's, \$5.00 to \$5.00, 35¢

Strops, Razor—

Genuine Emerson, 60¢60¢ to 60¢60¢
 Imitation, \$5.00 to \$5.00, 20¢10¢ to 20¢
 Torrey's, 20¢
 Radger's Belt and Com., \$5.00 to \$5.

Tinware	
Stamped, Japanned and Piced, list Jan. 30 1887.....	70¢10¢70¢10¢25¢
Tire Benders, Upsetters, &c	
See Benders and Upsetters, Tire.	
Tools.	
Coopers'—	
Bradley's.....	20¢
Barton's.....	30¢20¢5¢
L. & J. White.....	20¢25¢
Albertson Mfg. Co.....	25¢
Bentley's.....	20¢
Sandusky Tool Co.....	30¢30¢5¢
Shaves, Cincinnati Tool Co.....	20¢
Lumber.	
Ring Peavies, "Blue Line".....	¢ dos \$30.00
Ring Peavies, Common.....	¢ dos \$18.00
Steel Socket Peavies.....	¢ dos \$12.00
Mail Iron Socket Peavies.....	¢ dos \$12.00
Cant Hooks, "Blue Line".....	¢ dos \$16.00
Cant Hooks, Common Finish.....	¢ dos \$14.00
Cant Hooks, Mail Socket Clasp, "Blue Line" Finish.....	\$16.00
Cant Hooks, Mail Socket Clasp, Common Finish.....	¢ dos \$14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish.....	¢ dos \$14.00
Cant Hooks, Clip Clasp, Common Finish.....	¢ dos \$12.00
Hand Spikes.....	¢ dos 6 ft., \$15.00; 8 ft., \$20.00
Pike Poles, Pike & Hook, ¢ dos, 12 ft., \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$20.00	
Pike Poles, Pike only, ¢ dos, 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00	
Pike Poles, not ironed, ¢ dos, 12 ft., \$6.00; 14 ft., \$7.00; 16 ft., \$9.00; 18 ft., \$12.00; 20 ft., \$16.00	
Setting Poles, ¢ dos, 12 ft., \$14.00; 14 ft., \$15.00; 16 ft., \$17.00	
Swamp Hooks.....	¢ dos \$15.00
Saw.	
Atkins' Perfection.....	¢ dos \$12.00
Atkins' Excelsior.....	¢ dos \$6.00
Atkins' Giant.....	¢ dos \$4.00
Tobacco Cutters—See Cutters, Tobacco.	
Transom Lifters—See Lifters, Transom.	
Traps—	
Game—	
Newhouse.....	40¢40¢5¢
Oneida Pattern.....	70¢10¢
Game, Blake's Patent.....	40¢10¢5¢
Mouse and Rat—	
Mouse Wood Choker, ¢ dos holes, 11¢13¢	
Mouse, Round Wire.....	¢ dos \$1.50, 10¢
Mouse, Cage Wire.....	¢ dos \$2.50, 10¢
Mouse, Catch-em-alive.....	¢ dos \$2.50, 10¢
Mouse, Bonanza.....	¢ dos \$2.50, 10¢
Rat, Decoy.....	¢ gr \$10.00, 10¢
Cyclone.....	¢ gr \$5.25
Hotchkiss Metallic Mouse, 5-hole traps, ¢ dos, 9¢; in full cases, ¢ dos, 75¢	
Hotchkiss Imp. Rat Killer.....	¢ gr \$18.50
Hotchkiss New Rat Killer.....	¢ gr \$18.50
Schuyler's Rat Killer.....	¢ gr \$15.00
Trimmers.	
Butter and cheese.....	25¢
Trimmers, Spoke.	
Bonney's.....	¢ dos \$10.00, 50¢
Stearns.....	20¢10¢
Ives', No. 1, \$15.00; No. 2, \$12.00 ¢ dos.	55¢10¢
Douglas.....	¢ dos \$9.00, 20¢
Cincinnati.....	20¢

Trowels—	
Lothrop's Brick and Plastering.	
Reed's Brick and Plastering.....	50¢10¢5¢35¢
Diaton's Br'k and Plastering.....	25¢
Peace's Plastering.....	25¢
Clement & Maynard's.....	20¢
Rose's Brick.....	15¢20¢
Brade's Brick.....	25¢
Worrall's Brick and Plastering.....	25¢
Garden.....	70¢
Trucks, Warehouse, &c.—	
B. & L. Block Co.'s list, '82.....	40¢
Tubes, Boiler—	
See Pipe.	
Twine—	
Flax Twine.....	BC. B.
No. 9, 1/4 and 1/2 Bails.....	26¢ 34¢
No. 12, 1/4 and 1/2 Bails.....	25¢ 33¢
No. 15, 1/4 and 1/2 Bails.....	22¢ 32¢
No. 18, 1/4 and 1/2 Bails.....	20¢ 31¢
No. 24, 1/4 and 1/2 Bails.....	18¢ 30¢
No. 24, 1/4 and 1/2 Bails.....	18¢ 30¢
Chalk Line, Cotton, 1/2 Bails.....	25¢
Mason Line, Linen, 1/2 Bails.....	55¢
2-Ply Hemp, 1/4 and 1/2 Bails (Spring Twine).....	15¢
3-Ply Hemp, 1/2 Bails.....	15¢16¢
Cotton Wrapping, 5 Bails to a.....	15¢16¢
2, 3, 4 and 5-Ply Jute, 1/2 Bails.....	10¢
Wool.....	5¢4¢2¢
Paper.....	15¢14¢
Cotton Mops, 6, 9, 12 and 16 to do. to.....	15¢
Vices—	
Solid Box.....	
50¢10¢50¢10¢5¢	
Parallel—	
Fisher & Norris Double Screw.....	15¢10¢
Stephens.....	20¢20¢
Parker.....	30¢25¢
Wilson's.....	55¢
Howard's.....	40¢
Bonney's.....	40¢10¢
Millers Falls.....	40¢40¢10¢
Trenton.....	40¢25¢10¢
Merrill's.....	15¢20¢
Sargent's.....	60¢10¢
Backus and Union.....	40¢
Double Screw Leg.....	15¢10¢
Prentiss.....	30¢25¢
Simpson's Adjustable.....	40¢
Moore's.....	50¢
Massey Quick Action.....	20¢ 25¢
Saw Vices—	
Bonney's, Nos. 2 & 3, \$15.00.....	40¢10¢
Stearns.....	35¢10¢35¢10¢10¢
Stearns' Silent Saw Vices.....	35¢40¢35¢
Sargent's.....	60¢10¢
Hopkins.....	¢ dos \$17.50, 10¢
Reading.....	40¢10¢
Wentworth.....	30¢10¢
Miscellaneous.	
Combination Hand Vices.....	¢ gr \$42.00
Cowell Hand Vices.....	30¢
Bauer's Pipe Vices.....	10¢
Cincinnati.....	25¢10¢
Enterprise Pipe Vices, each.....	83.00
Massey Combination Pipe.....	40¢
Wads—Price per M.	
U.M.C.&W.R.A.—B.E., 11 up.....	08¢
U.M.C.&W.R.A.—B.E., 9&10.....	34¢
U.M.C.&W.R.A.—B.E., 8.....	06¢
U.M.C.&W.R.A.—B.E., 7.....	10¢
U.M.C.&W.R.A.—P.E., 11 up.....	1.15
U.M.C.&W.R.A.—P.E., 9&10.....	1.50
U.M.C.&W.R.A.—P.E., 8.....	1.70
U.M.C.&W.R.A.—P.E., 7.....	1.80
Sley's B.E., 11 up.....	\$1.70¢1.75
Sley's P.E., 11 up.....	3.00¢ 3.25

Wagon Boxes—See Boxes, Wagon.	
Washer Cutters—See Cutters, Washer.	
Wagon Jacks—See Jacks, Wagon.	
Ware, Hollow, Enameled, &c.	
Cast Iron, Hollow—	
Stove Hollow-Ware—	
Ground.....	60¢10¢
Unground.....	60¢10¢10¢
White Enameled Ware—	
Maslin Kettles.....	70¢10¢70¢10¢5¢
Boilers and Saucepans.....	50¢10¢40¢
Tinned Boilers and S'pans.....	50¢10¢ 50¢
Rustless Hollow-Ware.....	50¢50¢5¢
Gray Enameled Ware—	
Stove.....	50¢
Maslin Kettles.....	60¢10¢10¢
Boilers and Saucepans.....	40¢5¢
Enameled—	
Agate and Granite Ware, list Jan. 1, 1889.....	35¢10¢
Ironclad Enameled Ware.....	dis 35¢10¢
Kettles—	
Galvanized Tea-Kettles.....	
Inch.....	6 7 8 9
Each.....	55¢ 60¢ 75¢
Standard Fiber—	
Per Dozen.	
Plain, Dec'd.....	\$2.00 \$2.25
Wash-Basins, 10 1/4 in.....	2.25 2.75
Wash-Basins, 12 in.....	2.75 3.00
Kecklers, 11 1/4 in.....	4.00
Cupboards.....	3.00
Spittoons, "Daisy," 8 in.....	4.00 4.50
Peck Measure.....	4.00
Half-peck Measure.....	3.50
See also Falls.	
Indurated Fiber—25¢	
Spittoons, No. 2, ¢ dos.....	\$9.00
Basins, Ringed, ¢ dos, No. 3.....	\$3.00
Wash-tubs, Nested, Nos. 0, 1, 2 and 3 (4 pieces), ¢ nest.....	\$7.50
Kecklers, Nested, Nos. 1, 2, 3 and 4 (4 pieces), ¢ nest.....	\$3.70
Butter Bowls, 15, 17 and 19-inch (3 pieces), ¢ nest.....	\$3.25
Liquid Measures, pt., qt., 2 qt. and funnel (4 pieces) ¢ set.....	\$3.00
See also Falls.	
Silver Plated, Hollow—	
4 mo. or 5 ¢ cash in 30 days.	
Reed & Barton.....	
Meriden Britannia Co.....	40¢5¢
Simpson, Hall, Miller & Co.....	
Rogers & Brother.....	
Hartford Silver Plate Co.....	40¢5¢5¢
William Rogers Mfg. Co.....	
Washers—	
Size holes.....	5-16 1/4 1/2 3/4 1 1 1/2
Washers.....	6 5 5.50¢ 3
In lots less than 200 ¢, ¢, add 1/4¢, 5-3 boxes 1¢ to list.	
Wedges—	
Iron.....	¢ 3 3/4
Steel.....	¢ 3 1/4
Weights, Sash—	
Solid Eyes.....	
¢ ton \$15¢19	
Well Buckets, Galvanized—See Buckets, Well, Galvanized.	
Wheels, Well.	
3 in., \$2.35; 10 in., \$3.70; 12 in., \$4.3	
Wire and Wire Goods—	
Iron—	
Market.	
Br. & Ann'd, Nos. 0 to 18.....	77 1/2
Cop'd, Nos. 0 to 18.....	75 1/2

Galv., Nos. 0 to 18.....	67 1/2
Tin'd, Tinned list Nos. 0 to 18.....	67 1/2
Stone.	
Br. and Ann'd, Nos. 16 to 18.....	77 1/2
Bright and Ann'd, Nos. 19 to 26.....	80¢
Br. and Ann'd, Nos. 27 to 36.....	82 1/2
Tinned.....	
Tinned Broom Wire, 18 to 21, ¢.....	5¢
Galvanized Fence, Nos. 8 and 9.....	70¢
Brass, list Jan. 18, 1884.....	35¢
Copper, list Jan. 18, 1884.....	35¢
Annealed Wire on Spools.....	55¢
Mailin's Steel and Tin'd on Spools.....	55¢
Mailin's Brass and Cop. on Spools.....	45¢
Tate's Spooled, Tinned and Annealed.....	55¢
Tate's Spooled Cop. and Brass.....	55¢
Cast Steel Wire.....	36.00 to 5.3¢
Steel Music Wire, 12 to 30.....	¢ 70¢ 4¢
Wire Clothes Lines, see Lines.	
Wire Picture Cord see cord.	
Bright Wire Goods—	
Standard list.....	
80¢10¢	
Wire Cloth and Netting.	
Painted Screen Cloth, good quality,	
100 sq. ft., \$1.40	
Galvanized Wire Netting.....	
70¢10¢75¢	
Wire, Barb.	
F.o.b. cars Pittsburgh and Cleveland,	
\$2.75 ¢ cwt. for Painted, \$1.25 for Galvanized.	
5¢ ¢ cwt. advance on above f.o.b. cars	
Cincinnati and Allentown, Pa.	
10¢ ¢ cwt. advance for f.o.b. cars Joliet	
and Chicago.	
15¢ ¢ cwt. advance for f.o.b. cars St.	
Louis.	
33¢ ¢ cwt. advance for f.o.b. cars	
Omaha.	
35¢ ¢ cwt. advance for f.o.b. cars Law-	
rence, Kan.	
\$1.25 ¢ cwt. advance for f.o.b. cars San	
Francisco.	
Wire Rope—See Rope, Wire.	
Wrenches—	
American Adjustable.....	
40¢	
Baxter's Adjustable "S".....	
40¢10¢50¢	
Baxter's Diagonal.....	
40¢10¢50¢	
Cox's Genuine.....	
50¢25¢	
Cox's "Mechanics".....	
50¢10¢25¢	
Girard Standard.....	
55¢10¢	
Lamson & Sessions' Engineers'.....	
60¢10¢	
Lamson & Sessions' Standard.....	
70¢10¢	
P. S. & W. Agricultural.....	
75¢ 10¢75¢	
Girard Agricultural.....	
10¢5¢	
Lamson & Sessions' Agric'l.....	
10¢5¢	
Bemis & Call's	
Fast Combination.....	
25¢	
Merrick's Pattern.....	
25¢	
Brigg's Pattern.....	
25¢	
Cylinder or Gas Pipe.....	
40¢5¢	
No. 3 Pipe.....	
40¢10¢	
Alken's Pocket (Bright).....	
50¢10¢	
The Favorite Pocket.....	
¢ dos \$4.00, 40¢	
Webster's Fast Combination.....	
50¢10¢	
Boardman's.....	
25¢5¢	
Always Ready.....	
50¢	
Allyator.....	
50¢	
Donohue's Engineer.....	
50¢10¢	
Acme, Bright.....	
50¢25¢	
Acme, Nickel.....	
40¢25¢	
Wrenches.....	
70¢	
Walker's.....	
55¢25¢	
Diamond Steel.....	
55¢10¢	
Cincinnati Brace Wrenches.....	
55¢10¢25¢	
Tate's Wire Wrench.....	
55¢10¢25¢	
Wringers, Clothes—	
Am. Wringer Co.'s list, July 15, 91, 2¢ cash	
Wrought Goods—	
Staples, Hooks, &c., list Jan. 12, 1885,	
8¢85¢10	

PAINTS, OILS AND COLORS.—Wholesale Prices.

Animal and Vegetable Oils.	
Linseed, City, raw, per gal.....	42 ¢ ..
Linseed, City, boiled.....	45 ¢ ..
Linseed, Western, raw.....	37 ¢ 38
Lard, City, Extra Winter.....	56 ¢ ..
Lard, City, Prime.....	54 ¢ 55
Lard, City, Extra No. 1.....	52 1/2 ¢ 45
Lard, City, No. 1.....	37 1/2 ¢ 40
Lard, Western, prime.....	53 ¢ 54
Cotton-seed, Crude, prime, off grades.....	30 ¢ 30
Cotton-seed, Summer Yellow, off grades.....	25 ¢ 28
Cottonseed, Summer Yellow, off grades.....	37 ¢ 38
Sperm, Crude.....	32 ¢ 36
Sperm, Natural Spring.....	71 ¢ ..
Sperm, Bleached Spring.....	75 ¢ ..
Sperm, Natural Winter.....	78 ¢ 75
Sperm, Bleached Winter.....	78 ¢ 80
Whale, Crude.....	54 ¢ 55
Whale, Natural Winter.....	56 ¢ 58
Whale, Extra Bleached.....	58 ¢ 60
Sea Elephant, Bleached.....	63 ¢ 64
Menhaden, Crude, Sound.....	30 ¢ ..
Menhaden, Crude, Southern.....	31 ¢ ..
Menhaden, Light Pressed.....	31 ¢ 32
Menhaden, Bleached W'ter.....	33 ¢ 34
Menhaden, Extra Bleached.....	36 ¢ 36
Tallow, City, prime.....	43 ¢ ..
Tallow, Western, prime.....	64 ¢ 64
Cocoonut, Ceylon.....	74 ¢ 74
Cocoonut, Cochiti.....	21 ¢ 33
Cod, Domestic.....	31 ¢ 33
Cod, Foreign.....	36 ¢ 38
Red Elaine.....	39 ¢ 54
Red Saponified.....	39 ¢ 54
Bank.....	30 ¢ ..
Strait.....	60 ¢ 65
Olive, Italian, bbls.....	55 ¢ 65
Neatfoot, prime.....	55 ¢ 65
Palm, prime, Lacas.....	6 ¢ 64
Mineral Oils.	
Black, 25 gravity, 25 ¢ 30 cold test.....	74¢ 8
Black, 20 gravity, 15 cold test.....	54¢ 9
Black, 20 gravity, summer.....	64¢ 7
Cylinder light, altered.....	15 ¢ 20

Cylinder, dark, filtered.....	12	15
Cylinder, dard, s'tm refined.....	10	18
Paraffine, 23 1/2 to 24 gravity.....	13 1/2	14
Paraffine, 25 gravity.....	12 1/2	13
Paraffine, 28 gravity.....	9 1/2	10
Paraffine, red, 21 to 22 gr'ty.....	13	..
Paraffine, red, 23 to 23 gr'ty.....	13	14
Paints and Colors.		
Barytes, Foreign, 7 ton.....	\$23.00	@24.00
Barytes, Amer. floated.....	30.00	@32.00
Barytes, Amer. No. 1.....	30.00	@30.00
Barytes, Amer. No. 2.....	33.00	@16.00
Barytes, Amer. No. 3.....	11.00	@12.00
Blue, Celestial.....	6	8
Blue, Chinese.....	50	55
Blue Prussian.....	25	40
Blue, Ultramarine.....	8	25
Brown, Spanish.....	1 1/2	1
Brown, Vandyke, Amer.....	3	3 1/2
Brown, Vandyke, English.....	6	8
Carmine, No. 40, in bulk.....	3.10	..
Carmine, No. 40, in boxes or barrels.....	8.30	..
Carmin, No. 7, in ounce bottle.....	4.20	..
Chalk, in bulk.....	7 ton.	2.00
Chalk, in bbls.....	100 lb.	33
China Clay, English.....	7 ton.	13.00
Chromate Oxide, prep'd.....	3.90	..
Chromate Oxide, black.....	lots 1000	3.90
Chromate Oxide, black.....	less 1000	3.65
Chromate, Paris, in bulk.....	14	15 1/2
Chromate, Paris, 170 to 175 lb.....	14 1/2	15 1/2
Chromate, Paris, approx pack.....	16	21 1/2
Chromate, Chrome, ordinary.....	8	11
Chromate, Chrome, pure.....	23	25
Lead, Eng. B.E. white.....	8 1/2	10
Lead, Amer. White, dry or in oil.....	..	..
Kegs, lots less than 500 lb.....	..	7 1/2
Kegs, lots 500 lb to 5 tons.....	..	7
Kegs, lots 5 tons to 12 tons.....	..	6 1/2
Kegs, lots 12 tons and over.....	..	6 1/2
White in oil 25 to 35 lb tin pails.....	..	3 1/2
White, in oil 12 to 15 lb tin pails, add to keg price.....	..	1

